

**LIGHTS OUT IN THE BAKKEN: A REVIEW AND ANALYSIS OF  
FLARING REGULATION AND ITS POTENTIAL EFFECT ON NORTH  
DAKOTA SHALE OIL PRODUCTION**

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## I. INTRODUCTION

*I stood in awe and wonder, As I watched those flames aglow  
With a roar like distant thunder, From the dark depths down below  
The gas hissed through the piping, While the flames lit up the sky  
And liquid gold flowed through the hold, Of the separator nigh.*

– “Ferg” James, Turner Valley<sup>1</sup>

Years ago, there was only darkness on the North Dakota plains. Bismarck, Minot, and Dickinson appeared as small, bright lights to the west and south, bordered by a smattering of Canadian towns to the north. But over a decade later, images from space captured a brilliant area of light in the Williston Basin, glowing brighter than the bustling cities of Minneapolis and St. Paul in neighboring Minnesota. This area of light was not a city, but rather the Bakken shale play (the “Bakken”), alit by hundreds of drilling rigs and natural gas flares.<sup>2</sup>

The prolific escalation of activity in the Bakken is due to the relatively recent technological combination of horizontal drilling and hydraulic fracturing, coupled with high commodity prices. This requisite combination of technology and price permits economic hydrocarbon production of shale reservoirs. The resulting ramp up in shale production has propelled the United States to the top position as the world’s largest producer of oil and natural gas.<sup>3</sup> But with this increase in production is a corresponding increase in environmental concerns.

Foremost among these concerns is the rise in greenhouse gas (“GHG”) and volatile organic compound (“VOC”) emissions. Unlike concerns over water contamination or seismic activity by hydraulic fracturing or wastewater injection, which are still mired in controversy and undergoing scientific

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<sup>1</sup> “Ferg” James, *Turner Valley*, in *IN THE LIGHT OF THE FLARES: HISTORY OF THE TURNER VALLEY OILFIELDS* 20 (1979), available at <http://www.ourroots.ca/e/page.aspx?id=3528118>.

<sup>2</sup> Robert Krulwich, *A Mysterious Patch of Light Shows Up in the North Dakota Dark*, NPR (Jan. 16, 2013, 1:58 PM), <http://www.npr.org/blogs/krulwich/2013/01/16/169511949/a-mysterious-patch-of-light-shows-up-in-the-north-dakota-dark>.

<sup>3</sup> Quoc Trung Bui, *U.S. Is The World’s Largest Producer of Natural Gas. Here’s What That Means*, NPR (Oct. 17, 2013, 11:01 AM), <http://www.npr.org/blogs/money/2013/10/10/231475085/the-u-s-is-the-worlds-biggest-producer-of-natural-gas-heres-what-that-means>; Grant Smith, *U.S. Seen as Biggest Oil Producer After Overtaking Saudi Arabia*, BLOOMBERG (July 4, 2014, 11:56 AM) (includes volumes of natural gas liquids), <http://www.bloomberg.com/news/2014-07-04/u-s-seen-as-biggest-oil-producer-after-overtaking-saudi.html>; *U.S. Expected To Be Largest Producer of Petroleum and Natural Gas Hydrocarbons in 2013*, U.S. ENERGY INFO. ADMIN. (Oct. 4, 2013), <http://www.eia.gov/todayinenergy/detail.cfm?id=13251#>.

review,<sup>4</sup> increased air toxic emissions have been largely established and accepted by both the scientific community and the oil and gas industry as a direct consequence of increased anthropogenic activities, including hydrocarbon production activity.<sup>5</sup> The majority of these petroleum-related air emissions occur through flaring—a technique by which operators combust excess natural gas from oil and gas wells.<sup>6</sup> Often used when midstream connections are not available, flaring is common practice in the oil and gas industry.<sup>7</sup> Operators may employ flaring (1) during flowback, which is the period of time in the hydraulic fracturing operation when the injected slurry of water, proppant, and chemicals flows back through the wellbore or (2) when connection timelines are delayed—midstream companies can be notoriously uncertain with regards to construction timelines.<sup>8</sup> In lieu of shutting in the well (stopping production), which delays income of saleable and more valuable hydrocarbons, operators instead send these non-connected volumes of gas (often referred to as “waste gas” or “flare gas”) up through flare stacks, where those volumes are then ignited and combusted. Ideally the entire volume of flare gas combusts, resulting in the formation of carbon dioxide and water. But inefficient flaring may lead to partial combustion and the consequent exhaust of methane and other toxics into the atmosphere. Importantly, carbon dioxide, a greenhouse gas, is always emitted during the combustion process.

Responding to environmental litigation and pursuing the Obama Administration’s environmental mandates, the United States Environmental Protection Agency (“EPA”) issued new regulations in 2012 addressing

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<sup>4</sup> Compare Kevin Begos, *DOE Study: Fracking Chemicals Didn’t Taint Water*, ASSOCIATED PRESS (July 19, 2013; 5:48 PM), <http://bigstory.ap.org/article/ap-study-finds-fracking-chemicals-didnt-spread>, and Bebe Raupé, *Did You Feel It? Fracking Earthquakes Are Less Intense*, BLOOMBERG (Aug. 20, 2014, 2:30 PM), <http://www.bloomberg.com/news/2014-08-20/did-you-feel-it-fracking-earthquakes-are-less-intense.html>, with Mark Fischetti, *Fracking and Tainted Drinking Water*, SCI. AM., Sept. 2013, at 21, and Bryan Walsh, *Deep Disposal Wells from Oil and Gas Drilling Linked to Earthquakes*, TIME (July 12, 2013), <http://science.time.com/2013/07/12/deep-disposal-wells-from-oil-and-gas-drilling-linked-to-earthquakes/>.

<sup>5</sup> EPA, OFFICE OF INSPECTOR GEN., REP. NO. 13-P-0161, EPA NEEDS TO IMPROVE AIR EMISSIONS DATA FOR THE OIL AND NATURAL GAS PRODUCTION SECTOR 2–3 (Feb. 20, 2013), available at <http://www.epa.gov/oig/reports/2013/20130220-13-P-0161.pdf>; EXXONMOBIL, SUMMARY ANNUAL REPORT 2013, at 37 (2013), available at [http://cdn.exxonmobil.com/en/shareholder-archive/~media/Reports/Summary%20Annual%20Report/2013\\_ExxonMobil\\_Summary\\_Annual\\_Report.pdf](http://cdn.exxonmobil.com/en/shareholder-archive/~media/Reports/Summary%20Annual%20Report/2013_ExxonMobil_Summary_Annual_Report.pdf) (discussing reduction of emissions in the section titled “Protecting the Environment”); Gunmar Myhre et al., *Anthropogenic and Natural Radiative Forcing*, in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 675 (T.F. Stocker et al., eds., 2013), available at [http://www.climatechange2013.org/images/report/WG1AR5\\_Chapter08\\_FINAL.pdf](http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf).

<sup>6</sup> NICHOLAS P. CHEREMISINOFF, INDUSTRIAL GAS FLARING PRACTICES 3–9 (2013).

<sup>7</sup> D.A.J. RAND & R.M. DELL, HYDROGEN ENERGY: CHALLENGES AND PROSPECTS 39 (2008).

<sup>8</sup> SAEID MOKHATAB & WILLIAM A. POE, HANDBOOK OF NATURAL GAS TRANSMISSION AND PROCESSING 623 (2d ed. 2012).

emissions of VOCs in the oil and natural gas sector.<sup>9</sup> These new regulations are composed of a variety of rules, including revised oil and gas New Source Performance Standards that prohibit flaring and venting from certain oil and gas wells and facilities.<sup>10</sup>

After reviewing the new EPA air regulations, operators in North Dakota were relieved. The new regulations applied to only *natural gas wells* that were hydraulically fractured or refractured,<sup>11</sup> and the majority of the Bakken play consists of *oil wells* with associated gas.<sup>12</sup> Their relief was short-lived.

In July 2014, the state's oil and gas regulatory agency—the North Dakota Industrial Commission, through its Department of Mineral Resources, Oil and Gas Division—adopted a rigorous set of regulations requiring Bakken operators to drastically reduce gas flaring. Currently, North Dakota flares nearly 30% of its total monthly gas production.<sup>13</sup> By comparison, Texas, the country's largest producer of crude oil and natural gas, flares less than 1%,<sup>14</sup> and the global average is 3%.<sup>15</sup> Moreover, North Dakota's status as the country's second largest producer of crude oil means the failure to meet new state flaring regulations, which could result in agency-ordered production curtailment, may jeopardize domestic petroleum supplies and market prices.<sup>16</sup>

The response to increased flaring regulation is divided. Industry groups argue that the regulations impose burdens on the oil and natural gas sector, which provides the country with secure supplies and economic benefits. Conversely, environmental groups argue that without such oversight the industry would have little motivation to adopt emission-limiting technologies, and the failure to control carbon dioxide and methane emissions will almost certainly have dangerous atmospheric and biologic ramifications.

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<sup>9</sup> Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 77 Fed. Reg. 49490 (Aug. 16, 2012) (codified in 40 C.F.R. pts. 60, 63).

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> Associated gas occurs “in the form of gas cap associated with an oil zone.” HOWARD R. WILLIAMS & CHARLES J. MEYERS, *MANUAL OF OIL AND GAS TERMS* 61 (Patrick H. Martin & Bruce M. Kramer rev. ed, 15th ed. 2012).

<sup>13</sup> Clifford Krauss, *Industry in North Dakota To Cut Flared Natural Gas*, N.Y. TIMES, Jan. 29, 2014, [http://www.nytimes.com/2014/01/30/business/energy-environment/industry-in-north-dakota-promises-to-reduce-flared-natural-gas.html?\\_r=0](http://www.nytimes.com/2014/01/30/business/energy-environment/industry-in-north-dakota-promises-to-reduce-flared-natural-gas.html?_r=0).

<sup>14</sup> *Flaring Regulation*, RAILROAD COMMISSION OF TEX., <http://www.rrc.state.tx.us/about-us/resource-center/faqs/oil-gas-faqs/faq-flaring-regulation/> (last visited Nov. 12, 2014).

<sup>15</sup> Josh Wood, *Statoil Widens Natural Gas Capture Project in ND*, BLOOMBERG BUS. WK. (Sept. 11, 2014), <http://www.businessweek.com/ap/2014-09-11/statoil-widens-natural-gas-capture-project-in-nd>.

<sup>16</sup> See David Shaffer, *N.D. Oil Production Tops 1 Million-Barrels-a-Day Milestone*, STAR TRIB., June 17, 2014, <http://www.startribune.com/business/263507621.html>.

This Article examines the possible effects on North Dakota production from recent regulations prohibiting or limiting flaring in oil and gas operations. Part II provides an overview of the oil and gas exploration and production sector in North Dakota, in addition to discussing flaring in the Bakken. Part III reviews the new Environmental Protection Agency and North Dakota Industrial Commission flaring rules and the Bureau of Land Management's consideration of flaring rules on public lands. Part IV discusses the challenges faced by North Dakota operators with regards to the new regulations and possible solutions. Part V provides the Author's conclusions. This Article examines only flaring in the upstream sector and therefore does not discuss flaring as it relates to transportation or processing. While this Article discusses North Dakota production, its focus is on shale oil production from the Bakken. Finally, this Article examines Bakken flaring in an American context and does not consider international issues or global flaring policy.<sup>17</sup>

## II. BACKGROUND ON THE BAKKEN AND FLARING

### A. *History of the Williston Basin and Bakken Shale Play*

Henry O. Bakken was born on March 25, 1901, in Maynard, Minnesota.<sup>18</sup> His parents, Norwegian immigrants, soon moved their family to North Dakota, where they eventually settled near the town of Tioga, North Dakota.<sup>19</sup> Decades later, Tioga would come into prominence when on April 4, 1951, the Amerada Petroleum Company discovered first oil in North Dakota after drilling the Clarence Iverson No. 1 well.<sup>20</sup>

The Clarence Iverson No. 1 was drilled in the Williston basin, an intracratonic—i.e., an area where a stable continental crust once joined an

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<sup>17</sup> For information on global flaring, see the World Bank's Global Gas Flaring Reduction partnership, which "brings around the table representatives of governments of oil-producing countries, state-owned companies and major international oil companies so that together they can overcome the barriers to reducing gas flaring by sharing global best practices and implementing country specific programs." *About GCFR*, WORLD BANK, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/EXTGGFR/0,,contentMDK:21022944~menuPK:828161~pagePK:64168445~piPK:64168309~theSitePK:578069,00.html> (last updated Sept. 11, 2012). For a discussion of flaring in a specific international context, see Ashley Palomaki, *Flames Away: Why Corporate Social Responsibility Is Necessary To Stop Excess Natural Gas Flaring in Nigeria*, 24 COLO. NAT. RES. ENERGY & ENVTL. L. REV. 499 (2013).

<sup>18</sup> Amy Dalrymple, *Famous Bakken Formation Named for North Dakota Homesteaders*, OIL PATCH DISPATCH (Nov. 25, 2012), <http://oilpatchdispatch.areavoices.com/2012/11/25/famous-bakken-formation-named-for-north-dakota-homesteaders/>.

<sup>19</sup> *Id.*

<sup>20</sup> *First North Dakota Oil Well*, AM. OIL & GAS HIST. SOC'Y, <http://aoghs.org/editors-picks/north-dakota-williston-basin/> (last visited Oct. 13, 2014).

ancient sea<sup>21</sup>—sedimentary basin spanning across North Dakota, South Dakota, Montana, and the Canadian provinces of Saskatchewan and Manitoba.<sup>22</sup> The American region of the basin has an area of approximately 143,000 square miles.<sup>23</sup>

Over geologic time, pressure and heat transformed the marine carbonates and sedimentary rock that were trapped in the basin into oil and natural gas.<sup>24</sup> Although “[s]poradic pre-World War II exploration activity took place in the Williston Basin, . . . the few deeper wells drilled were unsuccessful.”<sup>25</sup> World War II placed Williston basin exploration on hold. After the war, “several major oil companies renewed their interest in the deeper [prospects],” which resulted in Amerada’s discovery of the Beaver Lodge field in North Dakota and Shell Oil Company’s discovery of the Richey fields in eastern Montana.<sup>26</sup>

Henry Bakken, who eventually settled near the town of Williston, North Dakota—the basin’s namesake—was eventually approached by the Amerada Petroleum Company to lease his land.<sup>27</sup> On July 13, 1951, Amerada commenced drilling on the Henry O. Bakken well.<sup>28</sup> Oil was discovered a few months later on September 5.<sup>29</sup> An old program on display at the Norseman Museum in Tioga “shows that Henry Bakken hosted a free barbecue with several family members and neighbors to celebrate the oil strike with performances by the school band and a vocalist.”<sup>30</sup> Amerada had discovered the Bakken shale.

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<sup>21</sup> RICHARD C. SELLEY, *ELEMENTS OF PETROLEUM GEOLOGY* 376–77 (2d ed. 1998); Tyler Crowe & Chris Neiger, *Better Know an Energy Play: Williston Basin*, *THE MOTLEY FOOL* (Dec. 18, 2012), <http://www.fool.com/investing/general/2012/12/18/better-know-an-energy-play-williston-basin.aspx>.

<sup>22</sup> Anne Steptoe, *Petrofacies and Depositional Systems of the Bakken Formation in the Williston Basin, North Dakota* (2012) (unpublished M.S. thesis, West Virginia University) (on file with West Virginia University); Crowe & Neiger, *supra* note 21.

<sup>23</sup> James A. Peterson & James W. Schmoker, *Williston Basin Province (031)*, in 1995 NATIONAL ASSESSMENT OF UNITED STATES OIL AND GAS RESOURCES—RESULTS METHODOLOGY, AND SUPPORTING DATA: U.S. GEOLOGICAL SURVEY DIGITAL DATA SERIES DDS-30, RELEASE 2 at 1 (D.L. Gautier et al., eds., 1995), available at <http://certmapper.cr.usgs.gov/data/noga95/prov31/text/prov31.pdf>.

<sup>24</sup> Crowe & Neiger, *supra* note 21.

<sup>25</sup> Peterson & Schmoker, *supra* note 23, at 1.

<sup>26</sup> *Id.*

<sup>27</sup> Dalrymple, *supra* note 18.

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*

The Bakken is a geologic formation within the Williston basin.<sup>31</sup> Both it and the Three Forks, which are of the Devonian-Mississippian geologic period, are targeted formations within Williston basin.<sup>32</sup> Composed of “three informal but distinct members consisting of an upper black shale, a middle organic-poor gray-brown calcareous siltstone, and a lower black shale that is similar to the upper member[.]”<sup>33</sup> it is the upper and lower shales within these formations that elicit the most petrogeologic interest.<sup>34</sup> The shales are rich in organic matter—a prerequisite for hydrocarbon generation.<sup>35</sup>

The Bakken is a prime example of an unconventional shale oil play.<sup>36</sup> Whereas a conventional hydrocarbon system requires a source rock, reservoir rock, migration pathway, and seal rock, in an unconventional play, the source rock is both the reservoir rock and the seal rock.<sup>37</sup> And unlike its conventional cousin, a migration pathway is not necessary.<sup>38</sup> Thus a conventional system, which possesses discrete zones of hydrocarbon accumulation that “have migrated into structural or stratigraphic traps with adequate reservoir properties[.]”<sup>39</sup> is geologically dissimilar from an unconventional system, where the “continuous oil accumulation is defined to include oil that is generated from thermally mature organic-rich shale that remains in or adjacent to the source rock with minimal migration.”<sup>40</sup> Geologists refer to such continuous accumulations “as ‘shale oil’ or ‘tight oil,’ depending upon whether the oil is produced from the shale itself or from adjacent tight reservoirs.”<sup>41</sup>

Although shale reservoir quality, which is generally measured in terms of geologic (effective) porosity and permeability, is poor, production may be obtained by hydraulically fracturing.<sup>42</sup> Fracturing exposes “a greater surface area of the reservoir rock to the wellbore in order to stimulate oil and gas

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<sup>31</sup> Peterson & Schmoker, *supra* note 23, at 9.

<sup>32</sup> *See id.* (In a non-geoscience context, the term “Bakken” generally refers to both the Bakken and Three Forks formations.).

<sup>33</sup> *Id.*

<sup>34</sup> *See id.*

<sup>35</sup> *Id.*

<sup>36</sup> *See id.*

<sup>37</sup> *See* Stephanie B. Gaswirth & Kristen R. Marra, *Bakken, Three Forks Largest Continuous US Oil Accumulation*, 112 OIL & GAS J. 48 (2013), available at <http://www.ogj.com/articles/print/volume-112/issue-1/exploration-development/bakken-three-forks-largest-continuous-us.html>.

<sup>38</sup> *See id.*

<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

<sup>42</sup> Peterson & Schmoker, *supra* note 23, at 9.

flow.”<sup>43</sup> Ultimately, “[p]roduction is controlled by [these] fractures, with the result that production rates and ultimate recoveries of wells exhibit a heterogeneous, ‘hit or miss’ character.”<sup>44</sup>

Even though Bakken exploration commenced in 1951 with the discovery of the Henry O. Bakken No. 1, it was not until the latter part of the 1970s that “the continuous nature of the Bakken accumulation was generally recognized and purposeful Bakken exploration . . . proceeded at a modest pace.”<sup>45</sup> In fact, during the first 50 years of Bakken exploration, “about 150 million [barrels] of oil were produced [using] . . . vertical drilling practices.”<sup>46</sup> But production skyrocketed after the advent of George Mitchell’s pioneering work in Texas, which combined horizontal drilling with hydraulic fracturing.<sup>47</sup> As a result of this technological combination, the Bakken formation has now produced over three quarters of a billion barrels of oil from wells in North Dakota and Montana.<sup>48</sup> Hence, the Bakken and the underlying Three Forks formation “have produced about 22% of the total cumulative oil production from the US portion of the Williston basin.”<sup>49</sup> Moreover, in the past decade, these two formations have accounted for over 80% of the basin’s annual production.<sup>50</sup>

Due to elevated political and economic interest in the Bakken,<sup>51</sup> the United States Geological Survey (“USGS”) formally reassessed the formation in 2013.<sup>52</sup> It found that the combined mean total oil resource of the Bakken and Three Forks formations is 7.38 billion barrels of oil, with 3.65 billion barrels of oil attributable to the Bakken formation and 3.73 billion barrels of oil attributable to the Three Forks formation.<sup>53</sup> Interestingly, “[t]he conventional oil component of this estimated resource is negligible (1% of the total estimated resource). This estimated undiscovered, technically recoverable resource makes the Bakken–Three Forks system the largest continuous oil accumulation in the

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<sup>43</sup> Gaswirth & Marra, *supra* note 37.

<sup>44</sup> Peterson & Schmoker, *supra* note 23, at 9.

<sup>45</sup> *Id.* at 10.

<sup>46</sup> Gaswirth & Marra, *supra* note 37.

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

<sup>53</sup> *Id.* But cf. Gregg Laskoski, *How Many Barrels Are in the Bakken?*, U.S. NEWS & WORLD REP. (May 7, 2014, 10:00 AM), <http://www.usnews.com/opinion/economic-intelligence/2014/05/07/the-bakken-shale-fields-hold-how-many-barrels-of-oil> (noting various estimates of Bakken reserves, including one from Continental Resources Inc.’s Chairman, Mr. Harold Hamm, who stated that “the Bakken holds more than 20 billion barrels of oil . . .”).

US,” accounting for “more than half of all domestic [USGS-]assessed tight oil resources.”<sup>54</sup> “By comparison, the second largest continuous oil accumulation in the US is the combined resources of the Eagle Ford Shale and Austin Chalk in the Western Gulf Basin Province (Texas and Louisiana), which was assessed at 1.7 billion [barrels] of oil.”<sup>55</sup> Unquestionably, halting or even reducing production in the Bakken could have devastating impacts on the U.S. economy, which would almost certainly include increasing foreign crude oil imports.<sup>56</sup>

*B. Flaring and the Hydrocarbon Production Process*

In 1929, Turner Valley, Alberta, was known as “Hell’s Half Acre.”<sup>57</sup> About 35 miles southwest of Calgary, Turner Valley was home to prolific oilfields that established the town as the center of the Canadian oil and gas boom during the first half of the 20th century.<sup>58</sup> For 30 years, Turner Valley was the largest petroleum producer in the British Empire.<sup>59</sup> The town’s infernal moniker was due to the vast number of flared wells that emitted massive quantities of heat, sulfurous odor, and thundering noise, saturating the valley.<sup>60</sup> At the time, there were insufficient natural gas pipelines to take the gas to market.<sup>61</sup> So gas that was not used to heat boilers or company town buildings was vented and set aflame.<sup>62</sup> Stories abound that during this time, the skies above Turner Valley “were lit both day and night from the glow of the magnificent flares that burned off the gas.”<sup>63</sup>

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<sup>54</sup> Gaswirth & Marra, *supra* note 37.

<sup>55</sup> *Id.*

<sup>56</sup> E-mail from Owen L. Anderson, Eugene Kuntz Chair in Oil, Gas & Natural Res., Univ. of Okla. Coll. of Law, to author (Oct. 3, 2014, 02:08 CST) (on file with author) [hereinafter Anderson E-mail].

<sup>57</sup> See NORMAN J. HYNE, *NONTECHNICAL GUIDE TO PETROLEUM GEOLOGY, EXPLORATION, DRILLING & PRODUCTION* 428 (3d ed. 2012).

<sup>58</sup> See Tony Seskus, *Turner Valley Discovery Set Stage for Alberta’s Prosperity*, CALGARY HERALD, May 14, 2014, <http://www.calgaryherald.com/technology/Turner+valley+discovery+stage+Alberta+prosperity/9835140/story.html>.

<sup>59</sup> BRADLEY P. TOLPPANEN, *CHURCHILL IN NORTH AMERICA, 1929: A THREE MONTH TOUR OF CANADA AND THE UNITED STATES* 100 (2014).

<sup>60</sup> *Id.* at 101.

<sup>61</sup> See *id.*

<sup>62</sup> *Id.*

<sup>63</sup> *History*, THE TOWN OF TURNER VALLEY, <http://www.turnervalley.ca/visitors/page-2a/> (last visited Nov. 11, 2014).

### 1. Technical Review of Flaring

Flaring is the controlled combustion of gaseous compounds. In an oil and gas context, flaring may transpire during several processes in the upstream (exploration and production), midstream (gas processing and transportation), and downstream (refining) sectors of the industry.<sup>64</sup> In the upstream sector, flaring often occurs (1) during the completion process to control pressure during the “flowback” stage following a hydraulic fracturing operation or (2) when production begins, but before a pipeline connection exists to transport the natural gas to market.<sup>65</sup> Thus it is often “a means of disposal used when there is no way to transport the gas to market and the operator cannot use the gas for another purpose.”<sup>66</sup>

A gas flare system basically consists of (1) a flare stack, which is composed of a tower containing an ignitor and gas pilot burners to light and burn combustible gas vapors (commonly referred to as “waste gas” or “flare gas”) and pipes that transport the flare gas to the stack,<sup>67</sup> (2) a knockout (disentrainment) drum to remove and store condensable and entrained liquids, and (3) a proprietary seal, water seal, or purge gas supply to prevent flash-back.<sup>68</sup> Flaring can take place at the wellsite or at a gas plant or refinery.

There are two types of flares, elevated and ground.<sup>69</sup> Operators choose a type based on the requirements of the well and facilities. Elevated flares are common at the wellsite because of their large capacities.<sup>70</sup> In an elevated flare system, the waste gas flows up through a vertical flare stack, where it is then

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<sup>64</sup> See *Flaring Classification*, IPIECA, <http://www.ipieca.org/energyefficiency/solutions/60281> (last visited Nov. 9, 2014). IPIECA is the former International Petroleum Industry Environmental Conservation Association, which was formed in 1974 as part of the United Nation’s Environment Programme. *About Us*, IPIECA, <http://www.ipieca.org/about-us> (last visited Nov. 9, 2014). It is now known as “the global oil and gas industry association for environment and social issues.” *Id.*

<sup>65</sup> Luke Geiver, *Pipeline Director Talks Trends in Pipeline Capacity, Flaring*, BAKKEN MAG. (Mar. 8, 2013), <http://thebakken.com/articles/43/pipeline-director-talks-trends-in-pipeline-capacity-flaring> (noting that a certain percentage of flaring results from “infrastructure congestion” or because some gas is not connected to takeaway pipelines).

<sup>66</sup> *Oilfield Glossary*, SCHLUMBERGER, <http://www.glossary.oilfield.slb.com/en/Terms.aspx?LookIn=term%20name&filter=flare> (last visited Oct. 13, 2014) (providing a definition of the word “flare”).

<sup>67</sup> OHIO ENVTL. PROT. AGENCY, UNDERSTANDING THE BASICS OF GAS FLARING 1 (2013), available at <http://epa.ohio.gov/portals/0/General%20pdfs/gas%20flaring.pdf>.

<sup>68</sup> EPA, AP 42, 5TH ED. VOL. I, COMPILATION OF AIR POLLUTANT EMISSION FACTORS 13.5 (1991) [hereinafter AP 42 EMISSION FACTORS], available at <http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s05.pdf>.

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

combusted at the tip of the stack (sometimes called a “flarehead”).<sup>71</sup> Some elevated flare systems contain a mechanism to blow air to promote efficient mixing of the waste gas.<sup>72</sup> This turbulent mixing reduces smoke production during the flaring process of heavy hydrocarbon waste gas.<sup>73</sup>

As the name suggests, ground flare combustion occurs at ground level.<sup>74</sup> Varying in complexity, “[g]round flares . . . may consist either of conventional flare burners discharging horizontally with no enclosures or of multiple burners in refractory-lined steel enclosures.”<sup>75</sup> Unlike elevated flares, ground flares are not “exposed to atmospheric disturbances such as wind and precipitation.”<sup>76</sup> But operators often prefer elevated flares over ground flares due to reduced cost, safety hazards, and operation noise levels.<sup>77</sup>

## 2. Review of Flaring Emissions

The word “flaring” conjures images of billowing, black clouds of dense smoke rising from cylindrical stacks. But in a pure combustion reaction, the only byproducts are colorless carbon dioxide and water, usually in vapor form.<sup>78</sup> During the reaction, methane—the main component of natural gas that usually makes up the majority of flare gas—and any other gaseous hydrocarbon molecules react with atmospheric oxygen to form carbon dioxide and water vapor.<sup>79</sup> While total combustion “requires sufficient combustion air and proper mixing of air and waste gas,”<sup>80</sup> less than complete combustion causes the escape of emissions such as carbon monoxide, hydrogen, unburned hydrocarbons, and other partially burned and altered hydrocarbons.<sup>81</sup> Generated hydrocarbon emission quantities relate to the degree of combustion,<sup>82</sup> which “depends largely on the rate and extent of fuel-air mixing and on the flame

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<sup>71</sup> See ALIREZA BAHADORI, NATURAL GAS PROCESSING: TECHNOLOGY AND ENGINEERING DESIGN 292 (2014).

<sup>72</sup> See *id.*

<sup>73</sup> NICHOLAS CHEREMISINOFF ET AL., RESPONSIBLE CARE: A NEW STRATEGY FOR POLLUTION PREVENTION AND WASTE REDUCTION THROUGH ENVIRONMENTAL MANAGEMENT 258 (2008); see also BAHADORI, *supra* note 71.

<sup>74</sup> CTR. FOR CHEM. PROCESS SAFETY, SAFE DESIGN AND OPERATION OF PROCESS VENTS AND EMISSION CONTROL SYSTEMS 168 (2006).

<sup>75</sup> AP 42 EMISSION FACTORS, *supra* note 68.

<sup>76</sup> *Id.*

<sup>77</sup> See CHEREMISINOFF ET AL., *supra* note 73, at 256–61.

<sup>78</sup> See AP 42 EMISSION FACTORS, *supra* note 68.

<sup>79</sup> *Id.*

<sup>80</sup> *Id.*

<sup>81</sup> CHEREMISINOFF ET AL., *supra* note 73, at 256–57.

<sup>82</sup> AP 42 EMISSION FACTORS, *supra* note 68.

temperatures achieved and maintained.”<sup>83</sup> Additional emissions may include NO<sub>x</sub>—a generic term for the mono-nitrogen oxides NO and NO<sub>2</sub> (nitric oxide and nitrogen dioxide).<sup>84</sup> These emissions form from the chemical reaction of nitrogen and oxygen in the air during combustion. Depending on the composition of the reservoir hydrocarbons, the gas may have other components such as sulfur, which can result in combustion byproducts of highly poisonous sulfur dioxide.<sup>85</sup>

### 3. Effects of Flaring Emissions

As discussed, flaring emissions often contain GHGs and VOCs. Greenhouse gases are those that trap heat within the atmosphere; while a volatile organic compound commonly refers to any atmospheric carbon compound, excluding elemental carbon, carbon monoxide, and carbon dioxide.<sup>86</sup>

#### *i. Greenhouse Gases*

Greenhouse gases, including water vapor, carbon dioxide, methane, nitrous oxide, and certain fluorinated industrial gases,<sup>87</sup> trap heat in the atmosphere, causing an elevation in surface temperatures—i.e., the greenhouse effect.<sup>88</sup> This greenhouse effect causes minute changes in temperature, which can cause “large and potentially dangerous shifts in climate and weather,” such as increased frequency and severity of floods, droughts, intense rain, or heat waves.<sup>89</sup> Scientific study indicates that other effects of climate change impact the earth’s oceans and glaciers. These impacts include water acidity, melting of the ice caps, and a resultant sea level rise.<sup>90</sup> Unfortunately, some changes, such

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<sup>83</sup> *Id.*

<sup>84</sup> *See id.*

<sup>85</sup> *See* CHEREMISINOFF ET AL., *supra* note 73, at 258.

<sup>86</sup> Richard G. Derwent, *Sources, Distributions, and Fates of VOCs in the Atmosphere*, in VOLATILE ORGANIC COMPOUNDS IN THE ATMOSPHERE 2 (Ronald E. Hester & Roy M. Harrison eds., 1995).

<sup>87</sup> Denee A. DiLuigi, Comment, *Kyoto’s So-Called “Fatal Flaws”: A Potential Springboard for Domestic Greenhouse Gas Regulation*, 32 GOLDEN GATE U. L. REV. 693, 697 (2002).

<sup>88</sup> *Climate Change: Basic Information*, EPA, <http://www.epa.gov/climatechange/basics/> (last updated Mar. 18, 2014) [hereinafter *Climate Change Basics*] (providing background regarding climate change issues).

<sup>89</sup> *Id.*

<sup>90</sup> Monika Rhein & Stephen R. Rintoul, *Observations: Ocean*, in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 297 (T.F. Stocker et al., eds. 2013), available at [http://www.climatechange2013.org/images/report/WG1AR5\\_Chapter03\\_FINAL.pdf](http://www.climatechange2013.org/images/report/WG1AR5_Chapter03_FINAL.pdf).

as the melting of the ice caps, are irreversible and therefore “require immediate action by all levels of government and by all contributors to GHG emissions.”<sup>91</sup>

At the wellsite, operators typically prefer flaring over venting as a means to dispose of waste gas. Their reasoning is that venting releases volumes of noncombusted methane into the atmosphere; whereas flaring releases volumes of the less impactful carbon dioxide.

Methane is one of five GHGs covered by the Kyoto Protocol and very potent in terms of climate change. Its global warming potential (GWP) is twenty-three times greater than that of carbon dioxide, which means that “for a given volume of methane emitted, the resulting global warming effect will be 23 times stronger over one hundred years compared to the same volume of [carbon dioxide].”<sup>92</sup>

However, scientists disagree over which is the more dangerous gas because of their disproportionate atmospheric lifespans. “[M]ethane remains in the atmosphere for a period of approximately 12 years after it has been emitted[,] . . . [while carbon dioxide] is estimated to have an atmospheric lifetime of 50–200 years.”<sup>93</sup> These aforementioned differences signify that while “methane has a relatively large global warming effect over a short period of time, . . . [carbon dioxide] has a relatively small global warming effect but over a much longer period of time.”<sup>94</sup>

#### ii. Volatile Organic Compounds

Volatile organic compounds are present in the atmosphere as a result of biogenic processes—e.g., emissions from plants, wild animals, natural forest fires, and anaerobic processes in bogs and marshes—and anthropogenic processes—e.g., human activities such as motor vehicle exhaust, petroleum production and refining, industrial processes, landfill waste, and agriculture endeavors.<sup>95</sup> VOCs are an important target of environmental regulation because of their significant impact on the ozone layer and therefore climate change,

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<sup>91</sup> *Climate Change Basics*, *supra* note 88.

<sup>92</sup> Monika Ehrman, *The Next Great Compromise: A Comprehensive Response to Opposition Against Shale Gas Development Using Hydraulic Fracturing in the United States*, 46 TEX. TECH L. REV. 423, 453 (2014) (alteration in original) (footnotes omitted) (quoting *What is Coal Seam Gas?*, WORLD COAL ASS'N, <http://www.worldcoal.org/coal/coal-seam-methane/> (last visited Oct. 14, 2014)).

<sup>93</sup> *Id.* (third alteration in original).

<sup>94</sup> *Id.*

<sup>95</sup> D. Ehhalt & M. Prater, *Atmospheric Chemistry and Greenhouse Gases*, in CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS 257–58 (J.T. Houghton et al., eds. 2001), available at <http://www.ipcc.ch/ipccreports/tar/wg1/pdf/TAR-04.PDF>.

including the greenhouse effect. Scientists believe that elevated VOCs contribute to (1) “stratospheric ozone depletion,” (2) “ground level photochemical ozone formation” and (3) “the global greenhouse effect.”<sup>96</sup>

### C. Flaring in the Bakken

The amounts were staggering. In 2011, the Energy Information Administration (“EIA”) reported that North Dakota natural gas production had more than doubled since 2005.<sup>97</sup> Gas production for September 2011 was 14,550 Mcf<sup>98</sup>—about 12% of total U.S. natural gas residential consumption.<sup>99</sup> But North Dakota operators were flaring up to 35% of this production “due to insufficient natural gas pipeline capacity and processing facilities in the Bakken shale region.”<sup>100</sup> Although flaring volumes have since decreased, operators continue to flare over 30% of natural gas production.<sup>101</sup> Remarkably, the percentage of flared gas in North Dakota is overwhelmingly higher than the national average. In 2009, less than 1% of natural gas produced in the United States was vented or flared.<sup>102</sup>

In 2011, the *New York Times* ran an article titled, *In North Dakota, Flames of Wasted Natural Gas Light the Prairie*.<sup>103</sup> The article described the wasted flared gas, noting how it “spew[ed] at least two million tons of carbon dioxide into the atmosphere every year, as much as 384,000 cars or a medium-size coal-fired power plant would emit.”<sup>104</sup> It also stated that no other U.S. oilfield flared as much as the Bakken, observing that the practice was still common in Iran, Nigeria, and Russia.<sup>105</sup> North Dakota certainly did not aspire

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<sup>96</sup> Derwent, *supra* note 86, at 3.

<sup>97</sup> *Over One-Third of Natural Gas Produced in North Dakota Is Flared or Otherwise Not Marketed*, U.S. ENERGY INFO ADMIN. (Nov. 23, 2011), <http://www.eia.gov/todayinenergy/detail.cfm?id=4030> [hereinafter *Over One-Third of Natural Gas Produced*].

<sup>98</sup> *Id.* (485 MMcf/d \* 30 days = 14,550 mmcf).

<sup>99</sup> *U.S. Natural Gas Residential Consumption*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/dnav/ng/hist/n3010us2m.htm> (last visited Nov. 11, 2014) (showing that in September 2011, the U.S. residential rate was 122,751 mmcf; therefore 14,550 mmcf / 122,751 mmcf = 11.85%).

<sup>100</sup> *Over One-Third of Natural Gas Produced*, *supra* note 97.

<sup>101</sup> *Nonmarketed Natural Gas in North Dakota Still Rising Due to Higher Total Production*, U.S. ENERGY INFO ADMIN. (Mar. 21, 2014), <http://www.eia.gov/todayinenergy/detail.cfm?id=15511>.

<sup>102</sup> *Over One-Third of Natural Gas Produced*, *supra* note 97.

<sup>103</sup> Clifford Krauss, *In North Dakota, Flames of Wasted Natural Gas Light the Prairie*, N.Y. TIMES, Sept. 26, 2011, at A1, available at <http://www.nytimes.com/2011/09/27/business/energy-environment/in-north-dakota-wasted-natural-gas-flickers-against-the-sky.html?pagewanted=1&r=0&adxnnl=1&partner=yahoonfinance&adxnnlx=1416198496-IihXTuWHOrFwUpvQF3tP6Q>.

<sup>104</sup> *Id.*

<sup>105</sup> *Id.*

to join that infamous membership. Less than two months after the article was published, the North Dakota Industrial Commission, which is composed of the Governor, Attorney General, and Agriculture Commissioner, wrote their U.S. Senators Kent Conrad and John Hoeven and U.S. Congressman Rick Berg.<sup>106</sup> The letter referred to the *Times* article, responding with actions that the State was taking to address flaring.<sup>107</sup> Two years later, after reviewing flaring emissions in the state, the advocacy group, Ceres, published a 2013 report titled *Flaring Up*.<sup>108</sup> In light of the increased drilling and production activity in the Bakken, the report focused on the increase in associated gas flaring and the potential value of lost natural gas liquids (“NGLs”) due to flaring.<sup>109</sup> The report stated that 55% of all wells being flared were not connected to a gathering system; and in May 2013, 266,000 Mcf per day of gas was flared, representing the oft-cited 30% of produced gas.<sup>110</sup> This production data is reported by operators to the North Dakota Industrial Commission while the connection data is tracked by the North Dakota Pipeline Authority.<sup>111</sup> More recent statistics show that the volume of flared gas has substantially increased, due in part to large petroleum production volumes, with 347,901 Mcf per day of gas flared in August 2014.<sup>112</sup> However, the percentage of gas flared decreased to 27.7%.

Two main factors explain the massive amount of flaring in North Dakota: (1) the character of the produced gas and (2) a lack of takeaway capacity.<sup>113</sup> First, unlike most shale gas wells, Bakken oil wells do not release

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<sup>106</sup> Letter from N.D. Indus. Comm’n to U.S. Senators Kent Conrad and John Hoeven and U.S. Congressman Rick Berg (Nov. 11, 2011), *available at* <http://www.nd.gov/ndic/ic-press/GasFlareInfo.pdf>.

<sup>107</sup> *Id.*

<sup>108</sup> RYAN SALMON & ANDREW LOGAN, *FLARING UP: NORTH DAKOTA NATURAL GAS FLARING MORE THAN DOUBLES IN TWO YEARS* (2013) [hereinafter CERES REPORT], *available at* <https://www.ceres.org/resources/reports/flaring-up-north-dakota-natural-gas-flaring-more-than-doubles-in-two-years>.

<sup>109</sup> *Id.*

<sup>110</sup> *Id.* at 3 (noting that 45% of flaring “occurs at wells that are already connected due to pipeline capacity and compression challenges”).

<sup>111</sup> EPA OFFICE OF AIR QUALITY PLANNING STANDARDS, OIL AND NATURAL GAS SECTOR HYDRAULICALLY FRACTURED OIL WELL COMPLETIONS AND ASSOCIATED GAS DURING ONGOING PRODUCTION 22–23 (2014) [hereinafter EPA ASSOCIATED GAS PAPER], *available at* <http://www.epa.gov/airquality/oilandgas/pdfs/20140415completions.pdf>.

<sup>112</sup> N.D. INDUS. COMM’N, DEP’T OF MINERAL RES., *HISTORICAL MONTHLY GAS PRODUCTION AND SALES STATISTICS*, *available at* <https://www.dmr.nd.gov/oilgas/stats/Gas1990ToPresent.xls> (spreadsheet indicating monthly statistics on gas production, gas sold, and gas flared in the Bakken since 1990).

<sup>113</sup> EPA ASSOCIATED GAS PAPER, *supra* note 111.

large amounts of natural gas during flowback.<sup>114</sup> In fact, less than 1% of flared gas in North Dakota is attributable to flowback.<sup>115</sup> Instead, the majority of produced gas in North Dakota is associated gas from Bakken and Three Forks shale oil wells.<sup>116</sup> “Associated” gas refers to natural gas produced in association with crude oil, which is common in petroleum reservoirs.<sup>117</sup> These reservoirs consist of various combinations of crude oil, natural gas, and water. In reservoirs containing both crude oil and natural gas, the natural gas exists as a gas cap or in solution with crude oil at high pressure, which behaves like carbon dioxide in a can of soda. In this soda analogy, when the can is opened, the hissing sound signals the carbon dioxide gas coming out of the soda solution and escaping into the atmosphere. Likewise, as crude oil is produced up the wellbore and the reservoir pressure decreases, the associated gas comes out of solution, requiring proper management.<sup>118</sup> This associated gas may contain ethane, propane, and butane, which are highly valuable NGLs that are sold at higher prices than dry natural gas.<sup>119</sup>

The second factor causing high amounts of flaring in North Dakota is a lack of pipeline and processing infrastructure. Unlike states such as Texas and Oklahoma, whose long histories of petroleum production resulted in comprehensive networks of pipelines, processing facilities, and marketing hubs, North Dakota’s recent entry as a major petroleum producing state means there was not an extensive transportation and processing infrastructure in place. And whereas crude oil may be stored as a liquid in tanks until it can be transported by truck, rail, or pipeline, natural gas cannot be practically stored above ground in gaseous form. Storing natural gas above ground would require compressing the gas into liquefied natural gas; this transformation is often cost-prohibitive and thus non-feasible. Typically, the associated gas is either flared or collected through small, low pressure gathering lines, where it travels to a gas processing facility. There the gas is separated via different mechanisms into

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<sup>114</sup> See Josh Wood, *North Dakota Governor Warns on Gas Flaring*, GREAT FALLS TRIB., May 21, 2014, <http://www.greatfallstribune.com/story/news/2014/05/21/north-dakota-governor-warns-on-gas-flaring-in-bakken/9385097/> (reciting State Mineral Resources Director Lynn Helms’s statistic that “99 percent of North Dakota [flared] gas is associated gas, or gas that is produced as a result of oil production.”). The Author therefore infers that 1% or less of North Dakota’s flared gas consists of flowback gas.

<sup>115</sup> *Id.*

<sup>116</sup> Rachael Seeley, *North Dakota Prepares To Restrict Oil Production for Operators That Fail To Meet Bakken Flaring Targets*, UNCONVENTIONAL OIL & GAS REP. (Aug. 13, 2014), <http://www.ogj.com/articles/uogr/print/volume-2/issue-4/north-dakota-prepares-to-restrict-oil-production-for-operators-that-fail-to-meet-bakken-flaring-targets.html>.

<sup>117</sup> UNIV. OF N.D. ENERGY & ENVTL. RES. CTR., ASSOCIATED GAS FLARING FACT SHEET 1 (2013), <http://www.undeerc.org/bakken/pdfs/NDIC-NDPC-Flaring-Fact-Sheet.pdf>.

<sup>118</sup> See generally LESTER C. UREN, *PETROLEUM PRODUCTION ENGINEERING: OIL FIELD EXPLOITATION* 17 (2d ed. 1939).

<sup>119</sup> Seeley, *supra* note 116.

its various components such as, methane, ethane, propane, butane, pentane, and pentane plus.<sup>120</sup> Although “there is a strong desire by all stakeholders to see this resource captured and to reduce gas flaring,”<sup>121</sup> long delays in permitting, labor shortages, and a short construction season<sup>122</sup> have led to a perfect storm of inadequate takeaway capacity in the Bakken.<sup>123</sup>

Ultimately, Bakken producers are not going to delay production while they wait on pipeline connections. Financially, producers lose all revenue if they shut in a well. And because crude oil trades at multiples higher than natural gas, it is a more valuable and pursued product than natural gas or even NGLs.<sup>124</sup> Thus producers see the associated gas as a less valuable byproduct of crude oil production, which can be sacrificed on the price altar.<sup>125</sup>

The convergence of these two factors results in the aforementioned 30% flaring statistic, which represents more natural gas being flared in the Bakken than the state’s total production two years ago.<sup>126</sup> As North Dakota governor Jack Dalrymple observed, “[I]t is a huge waste, to say nothing of the environmental impact.”<sup>127</sup>

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<sup>120</sup> Monika Ehrman, *Moving the Molecules to Market: An Introduction to Hydrocarbon Processing and Transportation*, in SPECIAL INSTITUTE ON OIL & GAS AGREEMENTS: MIDSTREAM AND MARKETING (Rocky Mountain Mineral L. Found. 2011).

<sup>121</sup> UNIV. OF N.D. ENERGY & ENVTL. RESEARCH CTR., *supra* note 117, at 1.

<sup>122</sup> Brian Kroshus, *The Challenge of Connecting Natural Gas to Market*, BISMARCK TRIB., Feb. 19, 2014, [http://bismarcktribune.com/bakken/breakout/the-challenge-of-connecting-natural-gas-to-market/article\\_9c22d6be-997d-11e3-ba81-0019bb2963f4.html](http://bismarcktribune.com/bakken/breakout/the-challenge-of-connecting-natural-gas-to-market/article_9c22d6be-997d-11e3-ba81-0019bb2963f4.html). Professor Owen L. Anderson further notes that

[i]t has also been difficult and expensive to negotiate for gathering line easements, which are generally required because gas must be transported across multiple leaseholds. Surface owners must allow mineral development related to the minerals beneath their surface, but generally not regarding other lands. Thus, surface owners that are not receiving royalties on production drive very hard bargains. Unitization might help. Eminent domain is not generally available because gas gathering and processing are generally done by none public utilities.

Anderson E-mail, *supra* note 56.

<sup>123</sup> UNIV. OF N.D. ENERGY & ENVTL. RESEARCH CTR., *supra* note 117, at 1.

<sup>124</sup> *See id.*

<sup>125</sup> The Author notes that producers may also flare natural gas, instead of shutting in the well, because there may be contractual obligations that require actual production to maintain the oil and gas lease.

<sup>126</sup> Tyler Crowe, *Why Can't the Bakken Get Gas Flaring Under Control?*, THE MOTLEY FOOL (June 17, 2014), <http://www.fool.com/investing/general/2014/06/17/why-cant-the-bakken-get-gas-flaring-under-control.aspx>.

<sup>127</sup> Luke D. Johnson, ‘Venting And Flaring’ Rule May Spur EPA Regs On Methane, LAW360 (Apr. 17, 2014, 6:14 PM), <http://www.law360.com/articles/529280/venting-and-flaring-rule-may-spur-epa-regs-on-methane>.

## III. REVIEW OF THE AIR EMISSION FLARING RULES

The former governor of Texas, George W. Bush, grew up in the West Texas oilfield town of Midland.<sup>128</sup> He entered the oil and gas business early in his career, following in his father's footsteps.<sup>129</sup> It was no surprise then that his administration actively promoted domestic hydrocarbon exploration and production—its agenda generally coinciding with the Republican tenants of hydrocarbon development. However, the Obama Administration has had to reconcile its political philosophies with fundamental economic truths. Petroleum is not a zero emission energy source, but the United States is the largest consumer of oil and natural gas in the world<sup>130</sup> and is still a net importer of petroleum.<sup>131</sup> From his first State of the Union Address to his fifth, President Obama's platform evolved from heralding clean energy investment, with its potential of transformative effects on the economy and environment,<sup>132</sup> to developing domestic natural gas with its promise of cleaner power and energy independence.<sup>133</sup>

Concurrent with this embrace of natural gas, the Obama Administration has maintained pressure on the oil and gas industry, pushing for reductions in air toxics and increased regulation.<sup>134</sup> This push is not unexpected. As one industry periodical reported:

With the spectacular rise of hydraulic fracturing in the U.S., it was inevitable that concerns about the effects of the process would arise. The Wall Street Journal recently reported that one in 20 Americans now live within a mile of a frac[tur]ing site. One of the most hotly contested issues surrounding frac[tur]ing

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<sup>128</sup> Susan Orlean, *A Place Called Midland*, NEW YORKER, Oct. 16, 2000, at 128, 128.

<sup>129</sup> *Id.* at 130.

<sup>130</sup> Andrew Critchlow, *US Oil Production Surge To Break Saudi Arabia's Grip on World Energy*, TELEGRAPH (Nov. 7, 2014; 10:07 AM), <http://www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/11215412/US-oil-production-surge-to-break-Saudi-Arabias-grip-on-world-energy.html> (subtitle stating that "Citibank report claims that rising US production over the next decade will erode the role of Saudi Arabia and Opec in supplying the world's largest energy consumer").

<sup>131</sup> U.S. ENERGY INFO. ADMIN., SHORT-TERM ENERGY AND WINTER FUELS OUTLOOK (STEO) 5–7 (2014), available at [http://www.eia.gov/forecasts/steo/pdf/steo\\_full.pdf](http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf).

<sup>132</sup> Tami Luhby, *State of the Union: Obama's Promises Kept and Broken*, CNN MONEY (Feb. 12, 2013, 12:22 PM), <http://money.cnn.com/2013/02/12/news/economy/state-of-the-union-promises/index.html>.

<sup>133</sup> Amanda Scott, *President Obama Talks Energy at the State of the Union 2013*, ENERGY.GOV (Feb. 13, 2013, 11:10 AM), <http://energy.gov/articles/president-obama-talks-energy-state-union-2013>.

<sup>134</sup> *Id.*

involves air emissions resulting from the flaring of natural gas at new wells.<sup>135</sup>

Regulation was in the air.

A. *The Environmental Protection Agency Flaring Rules*

The fates and fortunes of the energy industry and political administrations are often intertwined. In 2005, Congress passed the infamous “Halliburton Loophole,” a reference to the Energy Policy Act of 2005,<sup>136</sup> which, *inter alia*, exempted hydraulic fracturing operations from federal oversight under the Safe Drinking Water Act.<sup>137</sup> The loophole references Halliburton, the world’s largest provider of fracturing services, whose former chief executive officer was then Vice President Dick Cheney.<sup>138</sup> The Energy Policy Act of 2005 also amended the Clean Water Act (“CWA”) to add oil and gas construction to its list of exemptions, which already included oil and gas production.<sup>139</sup> Interestingly, the Energy Policy Act of 2005 was a bipartisan effort. Even the junior senator from Illinois, Barack H. Obama, voted for it.<sup>140</sup>

Historically, the oil and gas industry has “enjoyed relatively light regulation.”<sup>141</sup> For example, the Clean Air Act of 1970 exempts oil and gas wells from aggregation, which means each well site—and not all wells in an area or field—is considered an individual source of pollutants.<sup>142</sup> The Resource Conservation and Recovery Act, which tracks industrial wastes “cradle to grave,” exempts drilling mud and hydraulic fracturing waste water disposal.<sup>143</sup> And prior to 2012, the last performance standards adopted by the EPA for new

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<sup>135</sup> Jeremy Lessaris, *Flare Gas Regulation: Challenges, Opportunities for Energy Companies*, EXPLORATION & PRODUCTION MAG. (Apr. 1, 2014, 12:00 AM), <http://www.epmag.com/flare-gas-regulation-challenges-opportunities-energy-companies-714361>.

<sup>136</sup> Pub L. No. 109-58, 119 Stat. 594.

<sup>137</sup> Susan Phillips, *Burning Question: What Would Life Be Like Without the Halliburton Loophole?*, STATEIMPACT: PENNSYLVANIA (Dec. 5, 2011, 12:00 PM), <http://stateimpact.npr.org/pennsylvania/2011/12/05/burning-question-what-would-life-be-like-without-the-halliburton-loophole/>.

<sup>138</sup> *Id.*

<sup>139</sup> Mark Drajem & Katarzyna Klimasinska, *EPA Shrinking ‘Halliburton Loophole’ Threatens Obama Gas Pledge*, BLOOMBERG (Feb. 1, 2012, 12:01 AM), <http://www.bloomberg.com/news/2012-02-01/epa-shrinking-halliburton-loophole-threatens-obama-gas-pledge.html>.

<sup>140</sup> Phillips, *supra* note 137.

<sup>141</sup> *EPA To Regulate Air Emissions from Hydraulic Fracturing as Industry Comes Under Scrutiny*, MARTEN LAW (May 29, 2012), <http://www.martenlaw.com/newsletter/20120529-air-emissions-from-hydraulic-fracturing> [hereinafter *EPA To Regulate Air Emissions*].

<sup>142</sup> Phillips, *supra* note 137.

<sup>143</sup> *Id.*

natural gas industry emissions sources—the New Source Performance Standards (“NSPS”)—occurred in 1985.<sup>144</sup>

But before then Senator Obama began forming his thoughts about the presidency, environmental groups were readying themselves to take on a formidable opponent—not the oil and gas industry, but the EPA.<sup>145</sup>

Six days before President-elect Obama took the oath of office, WildEarth Guardians filed suit in the U.S. District Court for the District of Columbia, demanding that the EPA undertake its mandatory eight-year regulatory review of existing natural gas emissions standards.<sup>146</sup> The EPA eventually settled the litigation, “agreeing to make final decisions on rulemakings by January 2011,” which was later extended to April 2012.<sup>147</sup>

On April 17, 2012, the EPA issued final rules on air emissions for the oil and natural gas sector.<sup>148</sup> The agency required that the oil and gas sector, namely operators, “fully phase in control measures to capture targeted emissions by January [1,] 2015.”<sup>149</sup> The regulations included (1) a New Source Performance Standard for VOCs, (2) an NSPS for sulfur dioxide, (3) an air toxics standard for oil and natural gas production, and (4) an air toxics standard for natural gas transmission and storage.<sup>150</sup> As this Article focuses on regulations impacting hydraulic fracturing and flaring, it therefore discusses only the NSPS for VOCs.

VOC emissions from gas wells form (1) during the flowback process and (2) through venting and flaring during the hydraulic fracturing process.<sup>151</sup> Thus the EPA regulations dictated, *inter alia*, that beginning January 1, 2015, operators must use reduced emission completions (“RECs”) on new hydraulically fractured wells and older wells that are refractured.<sup>152</sup> These RECs are often referred to as “green completions,” which refers to a modified completion process that occurs after the hydraulic fracturing of a well. In a traditional shale completion, after the high-pressure fracturing fluid is injected into the wellbore to stimulate hydrocarbon flow, the injected fluid must be produced back up the wellbore. The resulting fluid is a mixture of gaseous hydrocarbons, reservoir brine, solids, and/or naturally occurring radioactive

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<sup>144</sup> EPA To Regulate Air Emissions, *supra* note 141.

<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

<sup>147</sup> *Id.*

<sup>148</sup> *Id.*

<sup>149</sup> Lessaris, *supra* note 135.

<sup>150</sup> EPA, PROPOSED AMENDMENTS TO AIR REGULATION FOR THE OIL AND NATURAL GAS INDUSTRY FACT SHEET 1 (2011) [hereinafter *Proposed Amendments*], available at <http://www.epa.gov/airquality/oilandgas/pdfs/20110728factsheet.pdf>.

<sup>151</sup> *Id.* at 2.

<sup>152</sup> 40 C.F.R. § 60.5375 (2013).

material (“NORM”). During this process, operators typically flow the wells at a maximum efficient rate to ensure they draw out as much of the flowback stream as possible. The flowback gas is separated from other components and often flared because there are no available processing facilities or transport options.<sup>153</sup> But in a green completion, the operator uses portable processing equipment to capture and separate the mix of gases, liquids, and other substances that flow from new wells.<sup>154</sup> “The captured natural gas [is] then . . . reinjected, used onsite, or sold.”<sup>155</sup> By its estimates, the EPA predicts this green completion requirement will reduce VOC emissions from new and modified hydraulically fractured gas wells by nearly 95%.<sup>156</sup>

To achieve these VOC reductions, operators can use RECs or completion combustion devices, such as flaring, until January 1, 2015. On and after January 1, 2015, operators cannot flare unless the wells fall under certain EPA-created compliance categories.<sup>157</sup> The first category includes “hydraulically fractured wildcat (exploration) and delineation wells and wells with insufficient reservoir pressure to permit green completion . . . .”<sup>158</sup> This category of wells is excepted from the flaring prohibition. The second category includes “all other wells fractured or refractured prior to January 1, 2015 . . . .”<sup>159</sup> These wells can utilize flaring, but are encouraged to use green completion technology.<sup>160</sup> The third category includes those wells fractured as of January 15, 2015.<sup>161</sup> These wells must employ green completion, but may continue to flare “any gas deemed unsuitable for commercial use.”<sup>162</sup>

In implementing these flaring regulations, the EPA insists that the rule will not only significantly reduce air pollution, but will also result in an

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<sup>153</sup> *Flaring vs. Green Completions*, NATURALGASNOW.ORG <http://naturalgasnow.org/hydraulic-fracturing-2/flaring-versus-green-completions/> (last visited Nov. 9, 2014).

<sup>154</sup> SCOTT C. BARTOS, EPA, CLIMATE CHANGE DIV., MINIMIZING METHANE EMISSIONS FROM UNCONVENTIONAL NATURAL GAS DEVELOPMENT 8 (2013), *available at* <http://www.doi.gov/intl/itap/upload/Session-03-04-Unconventional-Gas-Jakarta-07May2013.pdf>; *see* EPA, SUMMARY OF REQUIREMENTS FOR PROCESSES AND EQUIPMENT AT NATURAL GAS WELL SITES 1–2 (2012), *available at* <http://www.epa.gov/airquality/oilandgas/pdfs/20120417summarywellsites.pdf>.

<sup>155</sup> Lessaris, *supra* note 135.

<sup>156</sup> *Proposed Amendments*, *supra* note 150.

<sup>157</sup> 40 C.F.R. § 60.5375 (2013).

<sup>158</sup> *EPA To Regulate Air Emissions*, *supra* note 141; *see also* 40 C.F.R. §§ 60.5375(f)(1)–(3). A “delineation well” is one “used to define the borders of a . . . reservoir.” Elizabeth Burleson, *Climate Change and Natural Gas Dynamic Governance*, 63 CASE W. RES. L. REV. 1217, 1249 (2013).

<sup>159</sup> *EPA To Regulate Air Emissions*, *supra* note 141; *see also* 40 C.F.R. § 60.5375.

<sup>160</sup> *EPA To Regulate Air Emissions*, *supra* note 141.

<sup>161</sup> *Id.*

<sup>162</sup> *Id.*

estimated net cost savings of \$15 million annually.<sup>163</sup> According to the EPA, this savings results from incremental annual revenues—approximately \$180 million—from surplus natural gas production.<sup>164</sup>

The 2012 EPA air emissions regulations apply to the oil and natural gas sector. But the critical EPA flaring regulation, which this Article examines, is limited to natural gas wells. The reasoning may be obvious. The EPA was interested in gaseous hydrocarbons and their combustive byproducts because air emission control focuses on control of hydrocarbons and other compounds in the gas phase. And unlike its hydrocarbon cousin, crude oil is a liquid at standard ambient temperature and pressure.

Although the EPA issued the regulations in 2012, it was “swayed by comments raising concerns about the availability of green completion equipment and trained personnel, should the rule immediately go into effect nationwide.”<sup>165</sup> At the time, the green completion technology was concentrated in a few suppliers.<sup>166</sup> To allow time for an inventory accumulation of the requisite equipment, the EPA delayed its compliance deadline to January 1, 2015—“a decision that has earned the agency widespread, if somewhat muted, criticism from environmental interests.”<sup>167</sup> And while the EPA litigated and regulated, North Dakota watched and waited.

#### *B. The North Dakota Industrial Commission Flaring Rules*

Shortly after Henry O. Bakken celebrated his namesake oil discovery with friends and family, a petroleum trade association established a division on the oil-laden prairie.<sup>168</sup> The American Petroleum Institute (“API”) expanded into the State of North Dakota.<sup>169</sup>

Established on March 20, 1919, the API’s founding objectives included affording “a means of cooperation with the government in all matters of national concern,” fostering “foreign and domestic trade in American petroleum products,” and promoting “in general the interest of the petroleum

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<sup>163</sup> Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 77 Fed. Reg. 49490, 49534 (Aug. 16, 2012) (codified in 40 C.F.R. pts. 60, 63).

<sup>164</sup> *Id.* Calculation in 2008 dollars and assumes \$4/Mcf on natural gas (at wellhead) and \$70/bbl on condensate.

<sup>165</sup> *EPA To Regulate Air Emissions*, *supra* note 141.

<sup>166</sup> *Id.*

<sup>167</sup> *Id.*

<sup>168</sup> *See The Association*, N.D. PETROLEUM COUNCIL, [http://www.ndoil.org/about\\_us/the-association/](http://www.ndoil.org/about_us/the-association/) (last visited Oct. 12, 2014).

<sup>169</sup> *See id.*

industry . . . and the mutual improvements of its individual members . . . .”<sup>170</sup> Its directorate read like a prestigious who’s who in the American oil and gas industry and included executives from the legendary Seven Sisters, such as A.C. Bedford, chairman of the board of Standard Oil Company (New Jersey) and Martin Carey, general counsel for Standard Oil Company (New York).<sup>171</sup> Other notable member companies included Humble Oil & Refining Company, Sinclair Petroleum, The Texas Company, and Union Oil Company of California.<sup>172</sup>

This North Dakota division of the API was supported by the Rocky Mountain Oil and Gas Association.<sup>173</sup> Eventually, it grew into the North Dakota Oil and Gas Association, before adopting its present-day independent structure and becoming the North Dakota Petroleum Council (the “Petroleum Council” or “Council”).<sup>174</sup> Similar to the goals of its API predecessor, the Petroleum Council’s goals include improving “the image and presence” of its industry; representing the membership in the legislature and before regulatory agencies; and the all-encompassing delivery of “positive results on issues of importance.”<sup>175</sup> One such important issue would dominate the Petroleum Council’s calendar for part of 2013 and much of 2014. The North Dakota Petroleum Council turned its attention to flaring.

In September 2013, the Petroleum Council formed a Flaring Task Force, which was charged with researching and proposing flaring restrictions in the Bakken. Although the North Dakota Century Code contained provisions regarding flaring,<sup>176</sup> the recent satellite images of Bakken flaring had drawn undesirable attention on the northern prairie.<sup>177</sup> The high flaring volume from Bakken wells demanded a specific field-wide rule.

The Flaring Task Force consisted of 35 industry experts in natural gas gathering, processing, and transportation and met over 20 times since its September 2013 inception.<sup>178</sup> Finally, on a cold, wintry day in March 2014, the state oil and gas regulatory commission—the North Dakota Industrial Commission’s Department of Mineral Resources’ Oil and Gas Division—met

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<sup>170</sup> LEONARD M. FANNING, *THE STORY OF THE AMERICAN PETROLEUM INSTITUTE: A STUDY AND REPORT* 30 (1959).

<sup>171</sup> *Id.*

<sup>172</sup> *Id.*

<sup>173</sup> *The Association*, *supra* note 168.

<sup>174</sup> *Id.*

<sup>175</sup> *Id.*

<sup>176</sup> See discussion *infra* Part III.D.1.

<sup>177</sup> See, e.g., CERES REPORT, *supra* note 108.

<sup>178</sup> N.D. INDUS. COMM’N, NDPC FLARING TASK FORCE (2014) [hereinafter NDPC FLARING TASK FORCE], available at [http://www.ndoil.org/image/cache/ndpc\\_flaring\\_task\\_force\\_ndic\\_1-29-14\\_fnlv1.pdf](http://www.ndoil.org/image/cache/ndpc_flaring_task_force_ndic_1-29-14_fnlv1.pdf).

in Bismarck to present its review of the Flaring Task Force Report and Consideration of Implementation Steps to the North Dakota Industrial Commission (the “Commission” or “NDIC”).<sup>179</sup> This review contained (1) the findings of the North Dakota Petroleum Council and (2) a proposed framework regarding flaring in North Dakota.<sup>180</sup> The Commission then set forth its goals for a threefold reduction in flared volumes, the number of flaring wells, and the duration of well flaring.<sup>181</sup>

Months later, the Commission issued its orders. Beginning October 1, 2014, North Dakota oil producers would follow (1) set “production allowances that limit flaring at new and existing wells”<sup>182</sup> and (2) a requirement of “gas-capture plans for all new drilling permits.”<sup>183</sup> According to Lynn Helms, the Commission’s Director of Mineral Resources, “The overarching goal of [these orders] is to reduce the number of wells flaring and the volume of gas flared in North Dakota over time.”<sup>184</sup> But time was a luxury not afforded to North Dakota operators. Unlike the EPA, where litigation by industry groups forced a settlement giving natural gas operators almost three years to install and adapt various completion and flare reduction technologies, the Commission adopted the flaring task force recommended reductions<sup>185</sup> via a stepped flaring reduction plan, which would commence the same year.

### C. *The Bureau of Land Management Outreach Program on Public Lands Flaring*

*The Wall Street Journal* proposed another theory on the evolution of the flaring rules in the state. It surmised that “North Dakota’s promised actions to crack down on natural gas burn-offs” are concurrent with the federal government consideration of flaring regulations.<sup>186</sup> Earlier this year, the U.S. Department of the Interior (“Interior”) “held a series of public-outreach

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<sup>179</sup> *Id.* The Department of Mineral Resources makes the recommendations for the North Dakota Industrial Commission to consider. E-mail from Alison Ritter, Public Information Specialist, N.D. Dep’t of Mineral Res., to author (Nov. 5, 2014, 16:32 CST) (on file with author) [hereinafter Ritter E-mail].

<sup>180</sup> N.D. INDUS. COMM’N, 11:30 A.M. PRESENTATION OF THE DEPARTMENT OF MINERAL RESOURCES REVIEW OF NORTH DAKOTA PETROLEUM COUNCIL FLARING TASK FORCE REPORT AND CONSIDERATION OF IMPLEMENTATION STEPS (2014) [hereinafter PRESENTATION], available at [https://www.dmr.nd.gov/oilgas/presentations/NDIC030314\\_100.pdf](https://www.dmr.nd.gov/oilgas/presentations/NDIC030314_100.pdf).

<sup>181</sup> *Id.*

<sup>182</sup> Chester Dawson, *North Dakota Regulator Sets New Gas-Flaring Rules*, WALL ST. J., July 1, 2014, <http://online.wsj.com/articles/north-dakota-regulator-sets-tough-gas-flaring-rules-1404257684>.

<sup>183</sup> *Id.* Gas capture plans were already required on June 1, 2014. Ritter E-mail, *supra* note 179.

<sup>184</sup> Dawson, *supra* note 182.

<sup>185</sup> Ritter E-mail, *supra* note 179.

<sup>186</sup> *Id.*

sessions on the [flaring] issue in March and is currently reviewing the feedback.”<sup>187</sup> Interior reported that once it completes the review process, it will decide how to shape and implement flaring regulations.<sup>188</sup> Like the state, as a receiver of income from oil and gas royalty, Interior’s purpose of regulating flaring is to “establish appropriate standards to prevent waste and to promote the conservation of produced oil and gas.”<sup>189</sup>

On May 9, 2014, Michael L. Connor, Deputy Secretary for the Department of the Interior, welcomed an audience to the Ramada Grand Dakota Lodge in Dickinson, North Dakota.<sup>190</sup> Formerly a small agricultural community in Stark County, Dickinson was now one of the fastest growing cities in the United States due to the North Dakota oil boom. Industry representatives, tribe members, landowners, and health and environment groups all arrived to hear the Bureau of Land Management (“BLM”), which manages oil and gas development on public lands, discuss venting and flaring from oil and gas operations on public lands.<sup>191</sup> Unlike Texas, North Dakota has considerable oil and gas production on federal and Indian lands. The EIA reported in June 2014 that crude oil production on tribal lands increased from ten million barrels in 2003 to 46 million barrels in 2013.<sup>192</sup> Almost all of this increase occurred after 2010 and mostly in North Dakota, primarily on the Fort Berthold Indian Reservation in the western part of the state.<sup>193</sup>

Fort Berthold Indian Reservation is the home of The Three Affiliated Tribes (the “Tribes”), which comprises the Mandan, Hidatsa, and Sahnish

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<sup>187</sup> *Id.*

<sup>188</sup> *Id.*

<sup>189</sup> *Id.* (quoting statement by Interior Press Secretary, Jessica Kershaw).

<sup>190</sup> See U.S. BUREAU OF LAND MGMT., AGENDA: BUREAU OF LAND MANAGEMENT OUTREACH REGARDING VENTING AND FLARING FROM OIL AND GAS OPERATIONS ON PUBLIC LANDS (2014) [hereinafter AGENDA], available at [http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS\\_\\_REALTY\\_\\_AND\\_RESOURCE\\_PROTECTION\\_/energy/oil\\_and\\_gas.Par.76138.File.dat/PublicAgenda5914ND.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/oil_and_gas.Par.76138.File.dat/PublicAgenda5914ND.pdf).

<sup>191</sup> See U.S. BUREAU OF LAND MGMT., TRANSCRIPT OF PUBLIC OUTREACH: BUREAU OF LAND MANAGEMENT OUTREACH REGARDING VENTING AND FLARING FROM OIL AND GAS OPERATIONS ON PUBLIC LANDS (May 9, 2014) [hereinafter TRANSCRIPT], available at [http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS\\_\\_REALTY\\_\\_AND\\_RESOURCE\\_PROTECTION\\_/energy/oil\\_and\\_gas.Par.95222.File.dat/VFPublicLandsTransND.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/oil_and_gas.Par.95222.File.dat/VFPublicLandsTransND.pdf); *Public Events on Oil and Gas, Forums on Venting & Flaring from Oil and Gas Operations on Public and Indian Trust Lands*, U.S. BUREAU OF LAND MGMT., [http://www.blm.gov/wo/st/en/prog/energy/public\\_events\\_on\\_oil.html](http://www.blm.gov/wo/st/en/prog/energy/public_events_on_oil.html) (last visited Oct. 12, 2014).

<sup>192</sup> U.S. ENERGY INFO. ADMIN., SALES OF FOSSIL FUELS PRODUCED FROM FEDERAL AND INDIAN LANDS, FY 2003 THROUGH FY 2013, at 6 (2014), available at [www.eia.gov/analysis/requests/federallands/pdf/eia-federallandsales.pdf](http://www.eia.gov/analysis/requests/federallands/pdf/eia-federallandsales.pdf).

<sup>193</sup> *Id.*

(Arikara) Nations.<sup>194</sup> Located in western North Dakota, it is also home to the heart of the Bakken shale.<sup>195</sup> “After the 2008 signing of a revenue-sharing agreement between the tribes and the state, the number of active wells on the reservation quickly rose to almost 1,000.”<sup>196</sup> Estimated oil production is 330,000 barrels per day.<sup>197</sup> So as a result of the oil revenue, the tribes’ annual budget is over half a billion dollars.<sup>198</sup> Indeed, “[i]f the reservation were a state, it would rank as the 10th biggest oil producer in the country, ahead of Kansas.”<sup>199</sup>

But the abundance of oil and the lack of processing or transportation infrastructure, concurrent with a muddled regulatory scheme, has resulted in massive flaring volumes, which have significantly impacted statewide numbers.<sup>200</sup> Earlier this year, the Tribes reported flaring 48% of gas volumes, the bulk of which they stated was due to insufficient takeaway capacity.<sup>201</sup> Thus North Dakota’s oft-recited 30% flaring percentage “is somewhat skewed by flaring on the Fort Berthold Reservation . . . .”<sup>202</sup> The reservation accounts for about 30–40% of the oil production in the state and its high flaring percentages “count toward the state’s overall percentage . . . .”<sup>203</sup>

In addition to the BLM remarks made that afternoon in Dickinson, a variety of environmental and operational interest groups participated.<sup>204</sup> The Environmental Defense Fund praised the hearing as an example of the “President’s strategy to reduce methane emissions . . . .”<sup>205</sup> It noted that the

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<sup>194</sup> Phil Davies, *Bakken Has Brought Prosperity, Challenges, to Fort Berthold Indian Reservation*, FAIRFIELD SUN TIMES (Montana), Nov. 11, 2014, [http://www.fairfieldsuntimes.com/business/article\\_994375e8-69e3-11e4-82f2-57ff0a29cc9f.html](http://www.fairfieldsuntimes.com/business/article_994375e8-69e3-11e4-82f2-57ff0a29cc9f.html).

<sup>195</sup> *Id.*

<sup>196</sup> *Id.*

<sup>197</sup> Lauren Donovan, *Tribe Sees Election as the Most Significant*, BISMARCK TRIB., Oct. 14, 2014, [http://bismarcktribune.com/bakken/tribe-sees-election-as-the-most-significant/article\\_71941d8e-5423-11e4-b572-f7c174003c7c.html](http://bismarcktribune.com/bakken/tribe-sees-election-as-the-most-significant/article_71941d8e-5423-11e4-b572-f7c174003c7c.html).

<sup>198</sup> *Id.*

<sup>199</sup> Davies, *supra* note 198.

<sup>200</sup> Brian Scheid, *New Frontiers: Cutting Back Natural Gas Flaring in North Dakota Hits a Bump*, PLATTS.COM (Oct. 20, 2014), <http://blogs.platts.com/2014/10/20/gas-flaring-north-dakota/>.

<sup>201</sup> *Id.*

<sup>202</sup> James MacPherson, *ND Regulators Adopt Natural Gas Flaring Rules*, WASH. TIMES (July 1, 2014), <http://www.washingtontimes.com/news/2014/jul/1/nd-regulators-adopt-natural-gas-flaring-rules/>.

<sup>203</sup> *Id.*

<sup>204</sup> See TRANSCRIPT, *supra* note 191.

<sup>205</sup> Tomás Carbonell, Senior Attorney, Env'tl. Def. Fund, Statement at the BLM Forum on Venting and Flaring of Gas Produced from Onshore Federal Lands 1 (May 15, 2014), *available at* <http://blogs.edf.org/energyexchange/files/2014/05/EDF-BLM-Forum-Public-Statement-5-15.pdf>.

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General Accounting Office determined that between 4.2% and 5.0% of all natural gas produced from onshore federal lands “was vented, flared, or lost in fugitive emissions – enough gas to heat about 1.7 million homes each year.”<sup>206</sup>

In its presentation, the BLM suggested various methods to reduce venting and flaring on public lands, such as establishing a two-step flaring test. In this test, the operator would first perform an economic analysis on production and the flare gas. Second, depending on the analysis, if the gas conservation was economic, the operator would have to capture the gas; if it was not economic, the operator would be able to flare with an Approved to Flare permit.<sup>207</sup>

Thus, operators with Bakken production on tribal lands face a challenging situation. Unlike most federal and tribal lands, which fall under the domain of the federal government, the Fort Berthold Indian Reservation and the Three Associated Tribes are involved in oil and gas development on their lands. Therefore, confusion abounds on whether the governing authority is federal, state, and/or tribal.<sup>208</sup> No doubt, operators on North Dakota tribal lands will press for a voice in the regulatory process.<sup>209</sup>

*D. Review of the NDIC Flaring Rules*

Back in Bismarck, the Commission adopted a stringent set of flaring rules on July 1, 2014, with the aim of reducing flaring in incremental steps through 2020.<sup>210</sup> As proposed by the Flaring Task Force, failure to meet these regulations would result in production curtailment.<sup>211</sup> The Commission also required producers to submit a gas capture plan with their drilling permits as of June 1, 2014, to reduce immediate flaring volumes.<sup>212</sup> “The plan must include detailed information about when a well is slated for completion, its location and anticipated production. The plan also must contain a signed affidavit to show that gas-gathering companies have been consulted so that they may plan to meet the demand.”<sup>213</sup> The rules set forth the goals of capturing 74% of gas (i.e., reducing flaring to 26%) by October 1, 2014, capturing 90% of gas (i.e., reducing flaring to 10%) by October 1, 2020, and advocating the “potential for

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<sup>206</sup> *Id.*

<sup>207</sup> PRESENTATION, *supra* note 179.

<sup>208</sup> *See infra* Part IV.A.3.

<sup>209</sup> *See* Sconja Ludwig, Comment, *The Tribes Must Regulate: Jurisdictional, Environmental, and Religious Considerations of Hydraulic Fracturing on Tribal Lands*, 2013 BYU L. REV. 727 (2013).

<sup>210</sup> MacPherson, *supra* note 202.

<sup>211</sup> *Id.*

<sup>212</sup> *Id.*

<sup>213</sup> *Id.*

95% capture.”<sup>214</sup> Illustrating the industry-driven regulations, the October 1 date was chosen because ONEOK’s “Garden Creek II plant is scheduled to be operational at that time, adding 100 million cubic feet of gas processing per day.”<sup>215</sup>

According to the Commission, about one dozen oil companies are already meeting gas capture targets set for October 2014.<sup>216</sup> “Helms believes there will be ‘peer pressure’ among oil companies to ensure the targets are met.”<sup>217</sup> According to the Petroleum Council, “the industry has already invested more than \$6 billion in infrastructure to capture natural gas in the past six years and plans to spend at least an additional \$1.7 billion over the next two years building gas pipelines and other infrastructure.”<sup>218</sup> This spending amount dwarfs the estimate on regulation adaptation from the EPA on using green completions for natural gas wells. And although the Petroleum Council proposed curtailments as a penalty, Ron Ness, president of the Petroleum Council, believes the industry “can meet the flaring goals but hopes punishing companies by curtailing oil production will be used by regulators ‘as a last resort.’”<sup>219</sup>

#### 1. Existing NDIC Rules on Flaring

Section 38-08-06.4 of the North Dakota Century Code currently addresses gas flaring restrictions.<sup>220</sup> This statute covers all oil and gas production activities in the state, as opposed to field-wide rules, which apply to specific oil and gas fields like the Bakken. The section provides:

1. As permitted under rules of the industrial commission, gas produced with crude oil from an oil well may be flared during a one-year period from the date of first production from the well.

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<sup>214</sup> *In re* Hearing Called on a Motion of the Commission to Consider Amending the Current Bakken, Bakken/Three Forks, and/or Three Forks Pool Field Rules to Restrict Oil Production and/or Impose Such Provisions as Deemed Appropriate to Reduce the Amount of Flared Gas, No. 22058, ¶ 15 (July 1, 2014) [hereinafter N.D. Indus. Comm’n Hearing], available at <https://www.dmr.nd.gov/oilgas/or24665.pdf>.

<sup>215</sup> Maxine Herr, *Setting the Rules: NDIC Adopts Production Restriction Regs to Ensure Flaring Goals Are Met*, PETROLEUM NEWS BAKKEN, July 6, 2014, available at <http://www.petroleumnewsbakken.com/pntruncate/261480202.shtml>.

<sup>216</sup> MacPherson, *supra* note 202.

<sup>217</sup> *Id.*

<sup>218</sup> *Id.*

<sup>219</sup> *Id.*

<sup>220</sup> N.D. CENT. CODE § 38-08-06.4 (2013).

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2. After the time period in subsection 1, flaring of gas from the well must cease and the well must be:
  - a. Capped;
  - b. Connected to a gas gathering line;
  - c. Equipped with an electrical generator that consumes at least seventy-five percent of the gas from the well;
  - d. Equipped with a system that intakes at least seventy-five percent of the gas and natural gas liquids volume from the well for beneficial consumption by means of compression to liquid for use as fuel, transport to a processing facility, production of petrochemicals or fertilizer, conversion to liquid fuels, separating and collecting over fifty percent of the propane and heavier hydrocarbons; or
  - e. Equipped with other value-added processes as approved by the industrial commission which reduce the volume or intensity of the flare by more than sixty percent.
3. An electrical generator and its attachment units to produce electricity from gas and a collection system described in subdivision d of subsection 2 must be considered to be personal property for all purposes.
4. For a well operated in violation of this section, the producer shall pay royalties to royalty owners upon the value of the flared gas and shall also pay gross production tax on the flared gas at the rate imposed under section 57-51-02.2.
5. The industrial commission may enforce this section and, for each well operator found to be in violation of this section, may determine the value of flared gas for purposes of payment of royalties under this section and its determination is final.
6. A producer may obtain an exemption from this section from the industrial commission upon application that shows to the satisfaction of the industrial commission that connection of the well to a natural gas gathering line is economically infeasible at the time of the application or in the foreseeable future or that a market for the gas is not available and that equipping the well with an electrical generator to produce electricity from gas or employing a

collection system described in subdivision d of subsection 2 is economically infeasible.<sup>221</sup>

While the above rules limit gas flaring, they do not outright prohibit it. Under the statute, operators of oil wells may still flare the associated gas—gas produced in conjunction with oil production—for up to one year from the date of first production.<sup>222</sup> After that one year period, operators must cease flaring and the well must be capped;<sup>223</sup> connected to a gathering line or to an electrical generator (that runs on gas to generate electricity);<sup>224</sup> equipped with a system that removes 75% of the gas and natural liquids using a variety of methods that rely on compressing the natural gas and liquids to LNG form;<sup>225</sup> or a general catchall category that includes any other NDIC-approved method.<sup>226</sup>

Failure to comply with these regulations forces the producer to pay royalties to the royalty interest owners on any flared gas and gross production tax.<sup>227</sup> And it is the Commission that decides the value of the flared gas. Its determination is final.<sup>228</sup> But the producers have an out in the case of economically infeasible wells.<sup>229</sup> If any of the above-mentioned methods to capture the gas is economically infeasible as demonstrated to the Commission, the Commission may grant the producer an exemption.<sup>230</sup>

Now note that these flaring rules apply only to the well after first production.<sup>231</sup> Unlike the natural gas wells targeted by the EPA's natural gas flaring rules, 99% of gas produced in the Bakken is a byproduct of oil production—i.e., it is associated gas. Even so, section 38-08-06.4 does not address gas emitted during the flowback period. This omission was later addressed by Order 24665.

## 2. The New NDIC Bakken Flaring Rules – Order 24665

The Commission heard the matter considering amendment of the current Bakken/Three Forks field rules regarding the restriction of flaring on

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<sup>221</sup> *Id.*

<sup>222</sup> *Id.* § 38-08-06.4(1).

<sup>223</sup> *Id.* § 38-08-06.4(2)(a).

<sup>224</sup> *Id.* § 38-08-06.4(2)(b)–(c).

<sup>225</sup> *Id.* § 38-08-06.4(2)(d).

<sup>226</sup> *Id.* § 38-08-06.4(2)(e).

<sup>227</sup> *Id.* § 38-08-06.4(4).

<sup>228</sup> *Id.* § 38-08-06.4(5).

<sup>229</sup> *Id.* § 38-08-06.4(6).

<sup>230</sup> *Id.*

<sup>231</sup> *Id.* § 38-08-06.4(1).

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April 22, 2014.<sup>232</sup> By May 14, 2014, the Commission still had not issued the Order—it issued a 90-day continuance.<sup>233</sup> Finally, on July 1, 2014, the Commission released Order 24665. It ordered:

- (1) All Commission orders allowing wells completed in a Bakken, Bakken/Three Forks, and/or Three Forks Pool to produce at a maximum efficient rate shall remain in full force and effect through September 30, 2014. All wells completed in a Bakken, Bakken/Three Forks, and/or Three Forks Pool are hereafter allowed to produce at a maximum efficient rate through September 30, 2014. After September 30, 2014, the gas capture from all existing wells shall be evaluated and oil production from all existing and future wells shall not exceed the production allowances herein.
- (2) The first horizontal well completed in a Bakken, Bakken/Three Forks, and/or Three Forks Pool non-overlapping spacing unit shall be allowed to produce at a maximum efficient rate.
- (3) All wells completed in a Bakken, Bakken/Three Forks, and/or Three Forks Pool that have received an exemption to North Dakota Century Code Section 38-08-06.4 shall be allowed to produce at a maximum efficient rate.
- (4) All infill horizontal wells, including overlapping spacing units, completed in a Bakken, Bakken/Three Forks, and/or Three Forks Pool, shall be allowed to produce at a maximum efficient rate for a period of 90 days commencing on the first day oil is produced through well-head equipment into tanks from the ultimate producing interval after casing has been run; after that, such wells shall be allowed to continue to produce at a maximum efficient rate if the well or operator meets or exceeds the Commission approved gas capture goals. The gas capture percentage shall be calculated by summing monthly gas sold plus monthly gas used on lease plus monthly gas processed in a Commission approved beneficial manner, divided by the total monthly volume of associated gas produced by the operator. The operator is allowed to remove the initial 14 days of flowback gas in the total monthly volume calculation. The Commission will accept

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<sup>232</sup> N.D. Indus. Comm'n Hearing, No. 22058 (July 1, 2014), *available at* <https://www.dmr.nd.gov/oilgas/or24665.pdf>.

<sup>233</sup> *Id.*

compliance with the gas capture goals by well, field, county, or statewide by operator. If such gas capture percentage is not attained at maximum efficient rate, the well(s) shall be restricted to 200 barrels of oil per day if at least 60% of the monthly volume of associated gas produced from the well is captured, otherwise oil production from such wells shall not exceed 100 barrels of oil per day. The Commission will recognize the following as surplus gas being utilized in a beneficial manner:

- a. Equipped with an electrical generator that consumes surplus gas from the well;
  - b. Equipped with a system that intakes the surplus gas and natural gas liquids volume from the well for beneficial consumption by means of compression to liquid for use as fuel, transport to a processing facility, production of petrochemicals or fertilizer, conversion to liquid fuels, separating and collecting the propane and heavier hydrocarbons; and
  - c. Equipped with other value-added processes as approved by the Director which reduce the volume or intensity of the flare by more than 60%.
- (5) If the flaring of gas produced with crude oil from a Bakken, Bakken/Three Forks, and/or Three Forks Pool is determined by the North Dakota Department of Health as causing a violation of the North Dakota Air Pollution Control Rules (North Dakota Administrative Code Article 33-15), production from the respective pool may be further restricted.<sup>234</sup>

As of October 1, 2014, all Bakken and Three Forks oil and gas wells must capture at least 74% of produced gas.<sup>235</sup> Any producer that fails to meet this limitation is subject to production restrictions.<sup>236</sup> By January 1, 2015, the capture percentage increases to 77%; by 2016, it increases to 85%; and by 2020, it reaches 90%.<sup>237</sup>

More importantly, the Order addresses the flowback period. Producers have a 90-day period after first production to produce at a maximum efficient

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<sup>234</sup> *Id.*

<sup>235</sup> *Id.* ¶ 15.

<sup>236</sup> *Id.*

<sup>237</sup> *Id.*

rate.<sup>238</sup> Because the bulk of fracturing fluid is removed within the first 14 days of flowback, those first 14 days are not counted within the total monthly volume calculation.<sup>239</sup> A producer can then use the remaining 76 days to evaluate the well and then connect it to a gathering facility or utilize remote capture processes to meet the gas capture target volume.<sup>240</sup> If the producer cannot meet this requirement, it faces production restrictions, i.e., capturing 60% of gas through remote capture results in a production allowable of up to 200 barrels a day.<sup>241</sup> Failing to employ gas capture technology results in a restriction of 100 barrels a day until remedied.<sup>242</sup>

#### IV. ANALYSIS AND EFFECTS OF THE FLARING RULES ON BAKKEN OPERATORS AND POSSIBLE SOLUTIONS

##### A. *Analysis of the Rule Making Relationship Between Industry and Agency and Potential Challenges*

The relationship between the North Dakota Petroleum Council and the North Dakota Industrial Commission could act as a model for other oil and gas producing states. The Commission, cognizant of the impact of regulations on oil and gas operations, and also that its regulations may not be achievable or realistic, simply provided the Petroleum Council with a set of flaring goals. It was up to the Council to work with the Commission and its membership to determine how to best achieve those goals. The Council, then, consulted with its membership on each goal, (1) reviewing possible unintended consequences and (2) analyzing best solutions, identifying those that were impractical.<sup>243</sup> Most importantly, the Flaring Task Force examined the reasons behind flaring, and found it was principally due to the lack of processing capacity in North Dakota.<sup>244</sup> A review of projects coming online in future quarters allowed the Flaring Task Force to plan for decreases in flaring, knowing when capacity will become available.<sup>245</sup> For example, ONEOK plans to add a total of 300 million cubic feet of capacity per day in the first and fourth quarters of 2015 at its

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<sup>238</sup> *Id.* ¶ 4.

<sup>239</sup> Telephone Interview with Alison Ritter, Public Information Specialist, N.D. Dep't of Mineral Res. (Sept. 2014).

<sup>240</sup> Jim Magill, *North Dakota Regulators Adopt Tough Gas Flaring Rules*, PLATTS (July 1, 2014, 6:18 PM), <http://www.platts.com/latest-news/natural-gas/houston/north-dakota-regulators-adopt-tough-gas-flaring-21841899>.

<sup>241</sup> N.D. Indus. Comm'n Hearing, No. 22058, ¶ 4 (July 1, 2014), *available at* <https://www.dmr.nd.gov/oilgas/or24665.pdf>.

<sup>242</sup> *Id.*

<sup>243</sup> PRESENTATION, *supra* note 179.

<sup>244</sup> *Over One-Third of Natural Gas Produced*, *supra* note 97.

<sup>245</sup> *Id.*

Garden Creek III and Lonesome Creek facilities.<sup>246</sup> Knowing this future proposed capacity and extrapolating trends in volume and flaring gave the Flaring Task Force enough information to propose a practical and achievable reduction in flaring volumes.<sup>247</sup>

In review of the Commission's second goal—reducing the number of wells flaring—the Flaring Task Force proposed making the gas capture plans part of the drilling permit process.<sup>248</sup> That is, prior to the Commission issuing a permit to drill, operators would be responsible for showing the NDIC how they planned on capturing the associated gas.<sup>249</sup> Plans could include showing connection points and gas processing facilities, alterations in flowback process, etc.<sup>250</sup> Knowing that making plans is easier than implementing them, the Flaring Task Force proposed adding an affidavit requirement that the gas capture plan has been provided to a listed group of midstream gathering companies in the area.<sup>251</sup> The addition of a legal requirement emphasizes the importance of the gas capture component of the permit to drill.<sup>252</sup>

Finally, the Flaring Task Force provided a timeline to further the Commission's third goal of reducing the duration of flaring.<sup>253</sup> These deadlines force operators to comply with a schedule. But the Flaring Task Force realized that it was not enough to set forth regulations without a penalty for noncompliance.<sup>254</sup> Here, the Flaring Task Force reviewed existing regulations, wanting to avoid regulatory conflicts with proposed penalties.<sup>255</sup> It finally concluded that curtailing production may incentivize operators to comply with the flaring regulations, but only if that curtailment threat was balanced (i.e., curtailment should not act as a disincentive to drill).<sup>256</sup>

Besides the lack of litigation and limited time for implementation, there are obvious differences in regulations promulgated by an environmental government agency and those issued with the support and recommendation of an industry group. One difference is the use of economic consequences tied to production. Earlier in 2014, the Commission implemented the Petroleum Council's recommendations to set flaring targets for January 2015 and

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<sup>246</sup> PRESENTATION, *supra* note 179.

<sup>247</sup> *See id.*

<sup>248</sup> *Id.*

<sup>249</sup> *Id.*

<sup>250</sup> *Id.*

<sup>251</sup> *Id.*

<sup>252</sup> *See id.*

<sup>253</sup> *Id.*

<sup>254</sup> *Id.*

<sup>255</sup> *Id.*

<sup>256</sup> *Id.*

beyond.<sup>257</sup> Any company that failed to meet its gas capture target would be subject to penalties, such as mandatory production curtailments—a terrible fate for any producer with West Texas Intermediate trading at over \$75 per barrel<sup>258</sup>—and Commission-imposed fines of up to \$12,500 per offense, per day.<sup>259</sup> Regarding compliance, the NDIC rules permit that specific wells or even entire fields can exceed gas-flaring goals “as long as the owner is compliant on a countywide or statewide basis.”<sup>260</sup> The whole is thus more important than the sum of discrete parts.

Certainly, there are groups that would question the involvement of the producer-focused Petroleum Council in regulatory rule-making. After all, why would the Petroleum Council want to propose recommendations that may adversely affect its membership? If the regulations intend to address resource waste, shouldn't the Commission make them independent of industry guidance? The reasons may vary and could include: (1) the Petroleum Council recognizing the possibility, and likely probability, of the EPA establishing federal oversight over oil well flaring, which would have an immediate and direct impact on the Bakken. An industry proposal allows for a gradual decline in flaring, while demonstrating to the federal environmental agency that the industry recognizes the problem and wishes to correct it; (2) The industry likely wants to capture natural gas volumes of over 10.3 billion cubic feet. For example, these April 2014 volumes resulted in a possible revenue loss of nearly \$50 million at spot market prices;<sup>261</sup> (3) The industry may realize that many of its members already implement gas capture and green completion technology. Thus if the majority of its membership were already implementing the aforementioned technologies, then the Council risked little to promote industry-wide regulations to the NDIC. After all, if North Dakota flares 30% of its associated natural gas, that means that operators are already capturing the other 70%.

Another challenge in this cooperative industry-regulator relationship is the possibility of regulatory capture, which occurs “when a regulatory agency operates for the benefit of its regulated community, rather than in the public

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<sup>257</sup> Dawson, *supra* note 182.

<sup>258</sup> *Id.*; Cushing, *OK WTI Spot Price FOB*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D> (last visited Nov. 17, 2014) (showing West Texas Intermediate (“WTI”) trading prices near or above \$100 per barrel in the summer of 2014). The Author also notes the recent drop in WTI prices to below \$80 per barrel, which may affect Bakken production. *See generally* Brian Kroshus, *Navigating Declining Crude Oil Prices*, BISMARCK TRIB., Nov. 14, 2014, [http://bismarcktribune.com/bakken/breakout/navigating-declining-crude-oil-prices/article\\_30933c34-6c1f-11e4-b5de-3b2d41b7884e.html](http://bismarcktribune.com/bakken/breakout/navigating-declining-crude-oil-prices/article_30933c34-6c1f-11e4-b5de-3b2d41b7884e.html).

<sup>259</sup> N.D. CENT. CODE § 38-08-16 (2013).

<sup>260</sup> Dawson, *supra* note 182.

<sup>261</sup> *Id.*

interest . . . .”<sup>262</sup> The worry is that private influence will affect public decision-making.<sup>263</sup> For example, recent events in the financial services sector indicate that some regulating agencies were instead acting in the best interests of banks, instead of the agencies.<sup>264</sup> With regards to the Bakken, one could argue that the NDIC left regulation to the oil and gas industry, allowing the regulated industry to dictate favorable terms. But the agency also solicited the input of the public and other interest groups.<sup>265</sup> The *zone of regulatory effectiveness*, as defined by Michael Potter et al., describes a balance of input from the regulated community, retaining the necessary independence of the agency.<sup>266</sup> This “centrist approach to regulatory policymaking . . . facilitates administrators’ ability to make connections but maintain the decision-making authority to operate in the public interest, rather than the narrow clientele groups they are intended to regulate.”<sup>267</sup>

However, implementation of flaring regulations, even with industry input, causes certain negative effects on Bakken producers and accentuates future challenges.

#### 1. Decreased Production and Associated Commodity Revenue

Unquestionably, the primary concern with respect to the NDIC flaring rules is their effect on oil production. The economics of failure are significant. At current crude oil prices, failing to meet capture requirements results in production curtailment, which leads to decreased revenue streams. For example, curtailment of only 100 barrels per day could result in a loss of over

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<sup>262</sup> Michael R. Potter, Amanda M. Olejarski & Stefanie M. Pfister, *Capture Theory and the Public Interest: Balancing Competing Values To Ensure Regulatory Effectiveness*, 37 INT’L J. PUB. ADMIN., 638, 638 (2014).

<sup>263</sup> Hari M. Osofsky & Hannah J. Wiseman, *Dynamic Energy Federalism*, 72 MD. L. REV. 773, 840 (2013).

<sup>264</sup> See generally *This American Life: The Secret Recordings of Carmen Segarra*, CHI. PUB. RADIO (Sept. 26, 2014), <http://www.thisamericanlife.org/radio-archives/episode/536/the-secret-recordings-of-carmen-segarra> (detailing secret recordings made by a Federal Reserve Bank examiner during her interactions with the Fed and Goldman Sachs, showing that the Federal Reserve Bank of New York was supportive of Goldman Sachs policies instead of acting as an independent regulating agency). The Author notes that in light of the *This American Life* and *ProPublica* reports, a U.S. Senate subcommittee decided to hold a hearing on regulatory capture.

<sup>265</sup> N.D. Indus. Comm’n Hearing, No. 22058 (July 1, 2014), available at <https://www.dmr.nd.gov/oilgas/or24665.pdf> (listing various tribal and environmental participants, in addition to “concerned citizens”).

<sup>266</sup> Potter et al., *supra* note 262.

<sup>267</sup> *Id.* at 642.

\$7,600 per day.<sup>268</sup> That deficiency means producers could lose over a quarter million dollars per month on each well,<sup>269</sup> in addition to any Commission-imposed penalties. Assuming the average Bakken well costs nearly \$10 million to drill and complete,<sup>270</sup> curtailment will delay payout, which could have substantial consequences. Neither public shareholder nor private partner would be impressed.

The precipitous drop in crude oil prices is another major factor that affects development in the Bakken. Crude oil prices are down 25% since June 2014,<sup>271</sup> which makes unconventional plays like the Bakken more difficult to justify in terms of return. Experts disagree on the breakeven price for Bakken crude, which ranges on the low end from \$40 to \$60 per barrel and on the high end from \$75 to \$77 per barrel.<sup>272</sup> Thus, adding regulatory costs to an already low price environment may cause operators to stop drilling in certain areas of the play or to discourage exploration efforts. In fact, the Department of Mineral Resources (“DMR”) recently reported that the number of well completions decreased from 272 in August 2014 to 176 in September 2014. Director Lynn Helms of the DMR attributed the decrease to operator focus on flaring reductions.<sup>273</sup>

The first solution is the simplest. Where feasible, plan and locate wells and fields close to existing (or proposed) pipelines and processing facilities. This access to gathering lines allows for easy buildout, often without costly connection delays. However, producers should note that midstream buildout may be rare in certain Bakken areas, and therefore pipeline capacity may come at a premium, or not at all, due to scarcity. In that case, producers should consider building their own processing facilities or partnering with other producers. Although independents may shy away from becoming midstream

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<sup>268</sup> Multiply West Texas Intermediate (traded as “Light Sweet Crude” on the New York Mercantile Exchange [NYMEX], now “CME Group”) price by 100 barrels of oil, e.g.,  $\$76.03/bbl * 100 = \$7,603$ . See *Globex, Crude Oil Futures Quotes*, CME GROUP, <http://www.cmegroup.com/trading/energy/crude-oil/light-sweet-crude.html> (last visited Nov. 12, 2014).

<sup>269</sup> Multiply \$7,603 by 30 days (average days in one month) = \$228,090. Multiply \$7,603 by 365 days (days in one year) = \$2,775,095. This example considers only revenue and does not account for well costs, royalty payments, or other deductions.

<sup>270</sup> Christopher Helman, *Continental Shares Fall on Higher Bakken Costs, Boardroom Shuffle*, FORBES (Sept. 18, 2014), <http://www.forbes.com/sites/christopherhelman/2014/09/18/continental-shares-fall-on-higher-bakken-costs-shaving-1b-off-harold-hamms-fortune/>.

<sup>271</sup> Brian Kroshus, *Navigating Declining Crude Oil Prices*, BISMARCK TRIB., Nov. 14, 2014, [http://bismarcktribune.com/bakken/breakout/navigating-declining-crude-oil-prices/article\\_30933c34-6c1f-11e4-b5de-3b2d41b7884e.html](http://bismarcktribune.com/bakken/breakout/navigating-declining-crude-oil-prices/article_30933c34-6c1f-11e4-b5de-3b2d41b7884e.html).

<sup>272</sup> *Id.* (referring to Morgan Stanley and Goldman Sachs’ estimates on the high end).

<sup>273</sup> Jeff Beach, *Slowing Natural Gas Flaring Reduces N.D. New Oil Well Completions*, GRAND FORKS HERALD, Nov. 14, 2014, <http://www.grandforksherald.com/content/slowing-natural-gas-flaring-reduces-nd-new-oil-well-completions>.

owners, steady or increasing commodity values ensure a good probability of a midstream company purchasing the asset.

If midstream facilities are not available, the second solution is to practice green completion processes. As described earlier, “green completions” employ technologies that “separate and recover the gas,”<sup>274</sup> thereby reducing or even preventing emission. In fact, flaring regulations have acted as a catalyst for operators and/or entrepreneurs to develop emission-reducing technologies.<sup>275</sup>

Producers may also draw on the Platonic philosophy regarding necessity and invention by enlisting their in-house or external research and development departments to investigate other possible gas capture solutions. Smaller producers without access to these formal departments often obtain solutions from their own production engineers, by partnering with other producers, or accessing technology from third-party providers.

Although the research course requires an initial outlay of capital investment, it avoids the necessity of partnering with a midstream company who may take advantage of the producer’s predicament by charging exorbitant fees or demanding burdensome contractual terms. For example, the University of North Dakota’s Energy & Environmental Research Center (“EERC”), a successor to the U.S. Bureau of Mines and Department of Energy,<sup>276</sup> assessed various uses of flare gas upstream of midstream processing facilities.<sup>277</sup> The EERC “investigated using associated gas for power production, transportation fuel, and chemical production,” in addition to small-scale processes to recover NGLs.<sup>278</sup> One drawback to these uses is that the “distributed and transient nature of flared gas” complicates the economic viability of these alternatives.<sup>279</sup> The EERC also examined using flare gas for diesel generators powering

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<sup>274</sup> Keith B. Hall, *Recent Developments in Hydraulic Fracturing Regulation and Litigation*, 29 J. LAND USE & ENVTL. L. 29, 48 (2013).

<sup>275</sup> See e.g., Jennifer Hiller & John Tedesco, *While the Gas Burns, Companies Explore Solutions*, SAN ANTONIO EXPRESS-NEWS, Aug. 26, 2014, <http://www.expressnews.com/business/eagle-ford-energy/article/While-the-gas-burns-companies-explore-solutions-5714699.php>; *Statoil, GE and Ferus Expanding Flare Gas Solution in Bakken*, PENNENERGY, Sept. 10, 2014, <http://www.pennenergy.com/articles/pennenergy/2014/09/unconventional-oil-and-gas-statoil-ge-and-ferus-expanding-flare-gas-solution-in-bakken.html>; Karen Boman, *Primus Offers Small Scale Solution for Stranded Gas*, RIGZONE, Nov. 3, 2014, [http://www.rigzone.com/news/oil\\_gas/a/135726/Primus\\_Offers\\_Smaller\\_Scale\\_Solution\\_for\\_Stranded\\_Gas](http://www.rigzone.com/news/oil_gas/a/135726/Primus_Offers_Smaller_Scale_Solution_for_Stranded_Gas). The Author provides examples only to demonstrate the variety of actions being explored, considered, and/or implemented by Bakken operators and/or third-parties and does not endorse a particular technology.

<sup>276</sup> *History*, UNIV. OF N.D. ENERGY & ENVTL. RES. CTR., <http://www.undeerc.org/Explore/EERC-History.aspx> (last visited Oct. 12, 2014).

<sup>277</sup> UNIV. OF N.D. ENERGY & ENVTL. RESEARCH CTR., *supra* note 117.

<sup>278</sup> *Id.*

<sup>279</sup> *Id.*

drilling rigs.<sup>280</sup> Final results show that 1.8 billion cubic feet of gas “could be used annually to power 200 drilling rigs in North Dakota, saving over \$72 million in fuel cost.”<sup>281</sup> And if this flare gas can be used in diesel generators, that likely also means it can be used to power the pumps used in hydraulic fracturing operations.

## 2. Loss of Midstream Negotiation Leverage

The Bakken is a highly attractive market to natural gas midstream companies because of the volume of natural gas liquids, which are more valuable than dry natural gas. Negotiating a midstream gathering and processing agreement in advance of drilling allows for a planned takeaway system, reducing the flare gas volumes and increasing revenues to the producer through the sale of the NGLs. But the necessity of gathering lines and/or processing capacity places the producer in a negotiation quandary. Producers, often independents, are usually at a disadvantage in midstream negotiations.

Although it is wise to plan midstream facilities in advance of drilling plans, the producer is often focused on putting together leases or drilling when it contacts the midstream company. This lack of advance planning usually is not due to any remiss on behalf of the producer, but rather due to the volatile nature of commodity prices, which dictate leasing activities and drilling schedules. Also, in a frantic drilling environment like the Bakken, drilling rigs and completion crews are at a premium. Waiting on execution of midstream agreements or expansions may result in the loss of a valuable and essential contractor or even the lease itself.

What can a producer do to avoid a one-sided midstream negotiation? Aggregating volumes from numerous operators can increase producer bargaining power. A higher volume of gas and liquids throughout is far more attractive to a midstream company than a smaller volume. Producers can amass volumes and contribute them to the midstream company. One producer may have a good relationship with a certain midstream company, either because of past deals or because of high volumes in another state. Producers should not shy away from contacting its other corporate entities or asset groups, depending on the structure, and asking for a high-level contact in the midstream company. Also, executive-level contact and/or an initial meeting between the executives of the producer and midstream company is often a good first step if there is no existing relationship between the groups. Smaller producers should also consider wellhead sales to another larger producer, who has enough volumes to commit to a midstream company. But as infill drilling becomes more common in the Bakken, midstream connections should become more readily available

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<sup>280</sup> *Id.*

<sup>281</sup> *Id.*

and therefore more accessible, avoiding the high cost of rapid infrastructure development.

In addition to midstream contracts, producers may look for non-traditional purchasers of natural gas, to whom they may sell the newly captured product. Badlands NGL, LLC and its partners are investing \$4 billion on a new polyethylene production facility.<sup>282</sup> “Polyethylene is used in a variety of consumer goods and industrial plastics, and the plant will be able to produce 3.3 billion pounds of it annually, while employing 500 workers in a variety of jobs related to the manufacturing process . . . .”<sup>283</sup> Facilities that depend on natural gas feedstock may consider moving to the Bakken for a relatively inexpensive and plentiful supply, which increases the market for natural gas.

### 3. No Control Over Tribal Land Flaring

Even with these new flaring regulations in place, the elephant in the room remains the Bakken drilling on the Fort Berthold Indian Reservation. North Dakota’s commitment to reducing flared gas volumes absolutely requires the cooperation of the Reservation. When the BLM decided to hold its regional public meetings on flaring and venting, there was no question that this state would be one of the meeting locations.<sup>284</sup>

As mentioned in Part III.C, the Fort Berthold Indian Reservation is controlled by the Tribes.<sup>285</sup> Regulation of oil and gas development on the Fort Berthold Indian Reservation is difficult due to a unique set of characteristics, one of which is jurisdiction over and regulation of mineral development. The composition of land on the reservation is made up of “a variety of differing legal tenures (e.g., tribally-owned lands, federally-owned lands, allottee-owned lands, and non-Indian-fee-owned lands).”<sup>286</sup>

Recently, the Tribes “sent a six-page letter to operators outlining a proposed gas capture plan to manage flared gas.”<sup>287</sup> Based on a 1980 BLM notice regarding royalty payments, the Tribes indicated that it intends to supplement the BLM notice with a requirement that operators submit gas

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<sup>282</sup> Gene Lockard, *Producers Will Find Ready and Welcome Market for Nat Gas in Bakken*, RIGZONE, Oct. 17, 2014, [http://www.rigzone.com/news/oil\\_gas/a/135502/Producers\\_Will\\_Find\\_Ready\\_and\\_Welcome\\_Market\\_for\\_Nat\\_Gas\\_in\\_Bakken](http://www.rigzone.com/news/oil_gas/a/135502/Producers_Will_Find_Ready_and_Welcome_Market_for_Nat_Gas_in_Bakken).

<sup>283</sup> *Id.*

<sup>284</sup> See discussion *infra* Part IV.C.

<sup>285</sup> See *MHA History*, MHA NATION, <http://www.mhanation.com/main2/history.html> (last visited Nov. 13, 2014).

<sup>286</sup> Raymond Cross, *Development’s Victim or Its Beneficiary?: The Impact of Oil and Gas Development on the Fort Berthold Indian Reservation*, 87 N.D. L. REV. 535, 542 (2011).

<sup>287</sup> Maxine Herr, *Their Own Plan: Authority is Debated as the Three Affiliated Tribes Propose Flaring Rules*, PETROLEUM NEWS BAKKEN, Aug. 17, 2014, <http://www.petroleumnewsbakken.com/pntruncate/602688940.shtml>.

capture plans to be reviewed quarterly for adherence.<sup>288</sup> But most importantly, the Tribes intend to (1) require “operators to pay a percentage of gas royalties on a stair step time schedule”<sup>289</sup> and (2) reserve “the right to take all produced gas on the reservation scheduled to be flared if the operator is unable to sell it or use it to power operations.”<sup>290</sup>

In explanation, the Tribes’ letter “states that its flaring regulation is based on a mandated royalty system rather than a North Dakota Industrial Commission ‘penalty program.’”<sup>291</sup> Its proposed plan would take effect 60 days after Tribal Council approval and would allow operators to flare gas for only 30 days, as opposed to the Commission’s 90-day allowance.<sup>292</sup> Operators would then have to pay 25% of royalties on new wells and 75% on infill wells.<sup>293</sup> “After 90 days, that percentage rises to 50 percent for new wells. After 180 days, operators must pay 75 percent of royalties flared on new wells and 100 percent on infill wells. New wells that are still flaring after 270 days will be subject to a 100 percent royalty payment on flared gas.”<sup>294</sup>

These regulations obviously conflict with those of the Commission. So the question is, which rules should an operator follow? The answer is not clear. By a series of agreements and amendments, the Tribes assigned power over the reservation’s oil production to the state of North Dakota, but revised the agreement so that currently, oil and gas wells are “subject to applicable federal, tribal, and state regulatory provisions for the life of the well.”<sup>295</sup> This change jeopardized producers’ positions in the Fort Berthold Bakken. Previously, in 2008, the Tribes original agreement, which placed oil and gas production control in the state, provided companies with certainty that they could “conduct exploratory drilling on the reservation without fear of potential federal or tribal taxes because the state had ultimate authority.”<sup>296</sup> The Council voiced its concern, stating that it hopes the state and the Tribes “can concur on who has regulatory authority.”<sup>297</sup> Whatever the outcome on regulatory authority, all parties understand that North Dakota requires the participation of Bakken producers on the Fort Berthold lands to reduce flaring.

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<sup>288</sup> *Id.*

<sup>289</sup> *Id.*

<sup>290</sup> *Id.*

<sup>291</sup> *Id.*

<sup>292</sup> *Id.*

<sup>293</sup> *Id.*

<sup>294</sup> *Id.*

<sup>295</sup> *Id.*

<sup>296</sup> *Id.*

<sup>297</sup> *Id.*

## V. CONCLUSION

The North Dakota flaring regulations are a good compromise between the command and control style of the government and the market-driven economics of the oil and gas industry. Regulatory agencies are often favored in part because of their expertise in a particular area. The North Dakota Industrial Commission's Department of Mineral Resources has access to engineers, geoscientists, and analysts who can manage the state's natural resources and abide by that fundamental principal of oil and gas law—the prohibition against waste. But even with this expertise, the regulatory agency is not focused on economics or pricing. Conversely, oil and gas producers by necessity are experts in these areas. So approaching regulatory design using a bottom-driven method makes good economic and structural sense. The regulated groups can research and inform the agency about which standards and remedies are feasible and the agency saves time by allowing the industry group to conduct the research and thereby avoid costly and lengthy delays in implementation due to litigation and disputes. Supporters of the top-driven regulatory style would argue that industry groups would obviously tender less restrictive suggestions than those proposed by an agency. But since the regulatory agency remains the final reviewer and architect on the regulations, it is doubtful that industry would control the process; however, vigilance is required as most agencies are likely susceptible to regulatory capture.

Another trend illustrated by the North Dakota flaring rules is a state implementing such rules in advance of federal oversight. North Dakota demonstrated political astuteness by rolling out flaring regulations in such a short timeline. But its oil and gas operators, regulatory agencies, and state leaders were no doubt worried that an EPA-like regulation of associated gas flaring from oil wells would catch operators unaware and unable to meet caps and restrictions, resulting in a loss of crude output and revenue to the state. The fact that the EPA omitted oil wells from its regulation may also be an indication that the federal government was unwilling to lose a substantial portion of its domestic crude production, which would result in higher commodity prices and frustrated voters.

Regulation is typically not synonymous with capital growth. It is, by definition, a restriction and limitation, issued by empowered agencies to protect public interest or resources. Historically, the oil and gas industry has not favored regulation by agency, instead preferring that the companies themselves pursue environmental measures that are primarily driven by company core values, shareholder petitions, and/or market demand. The majority of environmentalists believe that government is the best proponent of regulation and legislation affecting industry. But pitting economic prosperity against environmental stewardship wins no allies. A successful partnership is a balanced one—where both sides attain a measure of success. North Dakota tried to achieve this consensus on flaring. Its success is yet to be determined—operators and producers still face enormous challenges and volatility in the

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ensuing months and years. Indeed, a decline in commodity prices may act as de facto regulation, mandating a decrease in flaring emissions due to producers forgoing or halting development in uneconomic portions of the shale. These producers will require technological advances and rapid adaptation, in addition to fiscal savvy, to thrive in the new Bakken. Their success may ultimately return darkness to the prairie.